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ASSEMBLING A SLIDE: READY TO CLAMP SIDING BOARDS

Practical Activities of a Manual Training Shop

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DURING the last few years, the schools of Kewanee, Ill., have been pulling further and further away from manual training of the old sort. The amount of work done by the manual training boys for the school public and, in some cases, also for the general public, has gradually increased. At first, these special pieces were only small articles. Last year, we took up the construction of these special pieces on a larger scale. Ten drafting cabinets for our drafting room and an office for our manual training department were successfully completed by the grammar-grade and high-school boys. This year, we are making playground apparatus for the grammar schools of the city and athletic apparatus for the high school. Six large "shoot-the-chutes" for the grades have been completed. The interest in such work has always been of the best. The difficulties and disadvantages that seemed apparent at the beginning were soon found to be the result of poor organization. After three years' experience we have come to the conclusion that such work has decided advantages over the old style manual training.

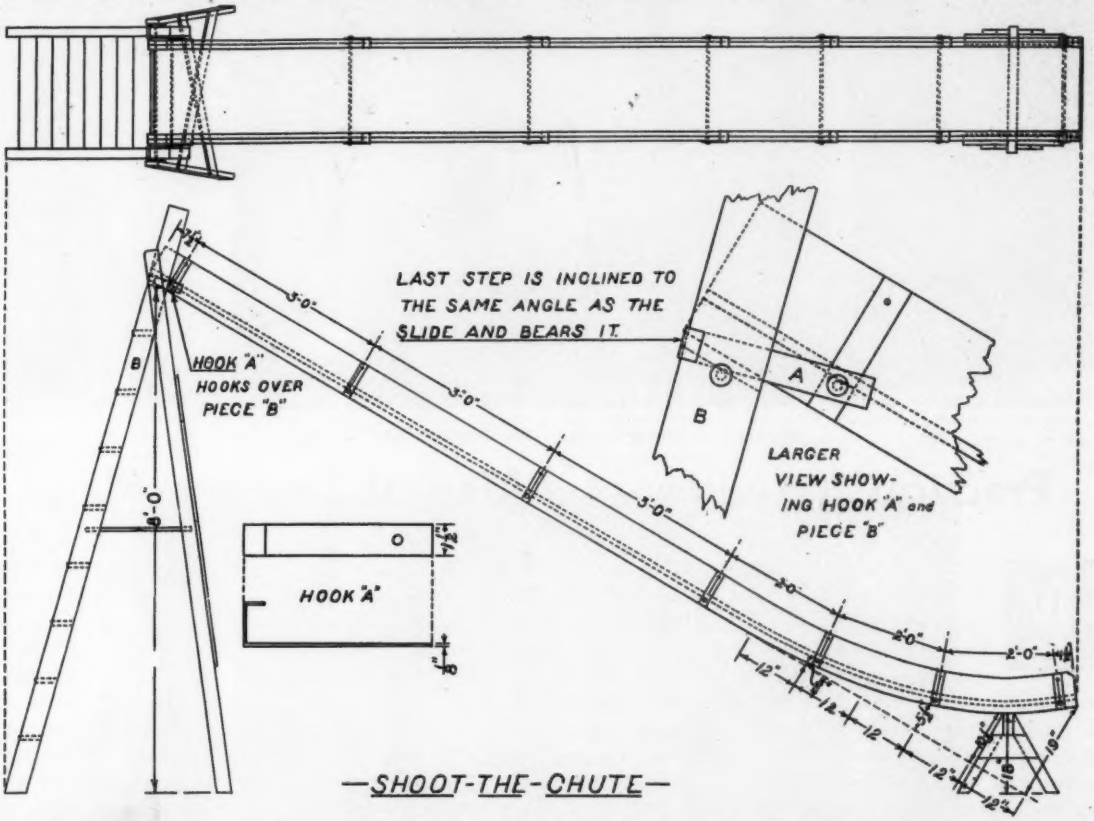
Some thought the boys would not show enough interest in such special work. We were not exactly sure of it ourselves until we saw, with no small amount of surprise, the interest and energy they put into their new activities. The pupils' interest in such work has always been more than sufficient. During the last year, it has been exceptional. The mere mention of a special piece to be made has generally created a stampede. For the most part it has taxed our ingenuity to get enough special work to keep those boys, who insisted on having it, busy. Every time a seventh or eighth-grade class would enter the shop for manual training, about one-quarter to one-half of the pupils would rush up to the instructor and request an opportunity to work on one of the special pieces. We have often had the whole class working on special pieces. During such times, the class as a body showed by the way they went at the work, and kept at it, too, that they could be held to such activities without loss of interest. In fact, it is our opinion that a class of seventh or eighth-grade boys would, as a body, work on special pieces the whole year with more interest than they have shown in the old kind of school shop work.

The high-school pupils generally show an equal interest. When it was learned what we intended to do in the shop, one high-school boy with a good academic record immediately rearranged his program so that he could spend all the morning, each day, in manual training. This boy spends his time on the "shoot-the-chutes" working out the best methods of constructing the different parts of the apparatus. Nearly one-third of our manual training high-school boys, of their own

accord, are employed continually on the special pieces. The high-school classes as a whole are always willing to help us out when we are rushed. They get a great deal of pleasure out of the work. It is only at such times that they can get up a real, genuine perspiration. In short, at no time has the interest of the seventh-grade, eighth-grade, or high-school in our special work been unequal to the occasion.

We have found that such work is apt to cause some confusion. There are often many little things that nobody knows quite how to do. When a boy is shown how to do one, he soon has it finished and is idle. After he has finished one little job he does not know what to do next, since he has no adequate comprehension of the work as a whole. The teacher can not stand over each pupil all the time in order to be ready to show him how to do each new phase of the work as soon as he finishes the one preceding it. To prepare the pupils by a general demonstration has seemed, in most cases, out of the question. The different kinds of little jobs to be done are too various, too short-lived, too unwieldy, often, and the pupils are too inexperienced to make such a procedure practicable. Therefore, the most effective way of manufacturing such special pieces seemed to be the group division of labor. By that method each boy would have a definite operation to learn to perform and a definite line of work to do for a reasonable length of time.

This confusion appeared at the very beginning of our first attempt at special work. In the second and following attempts it was not apparent to any extent, because we planned everything out on a large scale and did not farm out little jobs to each boy as is done in the old style manual training, and because we carried on the work by means of the group division of labor. The classes were formed into groups according to ability and experience and the best boy of each group was tactfully led into the leadership of his group. The work was assigned to the groups according to each group's capabilities. When we made the "shoot-the-chutes," one group of boys cut out the sections from which the sides were built; another group nailed them together; still another set of boys planed the sides down to the proper size and shape; a fourth group cut and bent the metal strips, or hooks, placed on the side pieces, and bored the necessary holes in them; a fifth group cut the threads, when required, on the bolts, and so on. No one group was kept at the same kind of work all the time. We shifted them around so that each group could obtain all the varieties of experience that the construction of the "shoot-the-chutes" could afford. If, for any reason, a group found itself, temporarily out of work, we always had plenty of articles such as taborets and bookcases, that somebody had ordered, to put the boys on until we were again ready for them to work on the "shoot-the-chutes." With this arrangement of group division of labor and subsidiary problems to fill in the slack periods of any group, we have had no difficulty in keeping all continually and profitably employed. The work has progressed without confusion and as rapidly as one could wish.


LAST STEP IS INCLINED TO THE SAME ANGLE AS THE SLIDE AND BEARS IT
HOOK "A" HOOKS OVER PIECE "B"
LARGER VIEW SHOWING HOOK "A" and PIECE "B"
HOOK "A"
3'-0"
2'-0"
12"
—SHOOT-THE-CHUTE—

This special work seems to have a few very good

points in its favor. It appears to be much more practical than old style manual training. In life, the boy is not very apt to be called upon to make a toothbrush holder or a magazine rack. These are good articles in themselves and he gets some valuable experience in their construction. But they do not give him that life-sized experience in real practical problems of the day. The "shoot-the-chutes," for example, involve real problems from the start. The pieces from which the sides are built must be so laid at the curve that the weakness of cross grained wood will be minimized to the greatest extent. A method by which the boards, from which the side pieces are built, can be held together firmly against all kinds of weather and all kinds of rough usage, must be devised. Constructions are needed that will make it possible to remove the "shoot-the-chute," at any time, easily and quickly from the step ladder and to fold up the step ladder when necessary. Contrivances, as jigs, must be often rigged up by which a large number of pieces of the same size or shape may be cut or bored without the trouble of remeasuring or remarking each piece. The boys saw the value of such an arrangement very forcibly in the construction of 50 collapsible hurdles for the high school. To get the exact height of a collapsible hurdle is quite a problem. With the use of a jig, however, in boring the holes, it becomes the simplest kind of a problem. All these problems are life size. They are, too, just the kind of problems that we are continually meeting in real life.

The work has a socializing influence. Nearly all of a boy's school work is for his own individual advantage or pleasure. In this kind of work he finds the source of his pleasure and interest outside of himself. Somebody else is to be considered, to be pleased or profited. Nine-tenths of the work on the "shoot-the-chutes" was for the pleasure of some other boys, in different parts of the city, most of whom he did not even know.

Then, too, this special work confronts the boy with another social idea, namely, the interdependence of us all. If the first group does not do its work well the second group must stop and straighten out the first group's mistakes. At this the boys generally "kick" and complain that they cannot do their work when they have to do over again the work of the boys who are supposed to prepare some stage in the process of the work for them. As a result, they begin to see that what they do is going to help or hinder some one else. The consequences of what they do do not end in themselves.

The Shoot-the-Chutes Completed.

Sections of Side Piece Ready to be Built Up.

Construction of a Shoot-the-Chute.

We found no difficulty in working up plans and methods for the construction of the drafting cabinets, tables, and so on. Such things are quite familiar to all of us. The construction of the "chute-the-chutes" was, however, a different proposition. There is very little material on the subject. For that reason, it may be of interest to some to know how we worked out the problem. Our solution of the problem we do not claim to be final. It is only suggestive.

The shoot-the-chutes are made sixteen feet long and sixteen inches wide inside measure. The side pieces are of ⅞ inch white pine, 7 inches wide, built up in two thicknesses, and so laid at the curved section that the grain of each board will run in a different direction, thereby making the cross grained part as strong as possible. To join the side pieces to the sliding board a piece about one and one-quarter inches thick, and two inches wide is usually placed, edge up, about every twelve inches under the sliding board. The ends of these pieces are made round, one inch in diameter, and run into the side pieces where they are held firmly by means of wedges, driven into the round ends. See Figure 1. But we did not have enough grade boys with either the time or skill to do such work. Even if we had had them, we could not have used such a construction since the boards of the side pieces could not be held together firmly enough to make such a method worth while. If the side pieces had been made of one solid piece of timber, a timber two inches thick and six inches wide, for example, such a construction would have been feasible, but we had no satisfactory lumber anywhere near those dimensions. Therefore, returning to the method of joining the sides to the sliding board, we simply took a piece of soft steel of the required length, one and one-half inches wide and ⅛ of an inch thick, and bent the end over, one and one-quarter inches from the end, to hook on the top of the side. Then, after

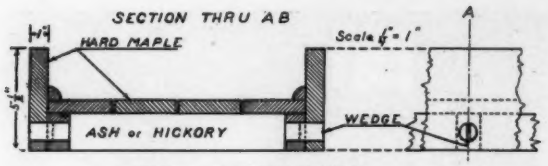


FIG. 1.—A SLIDE DETAIL

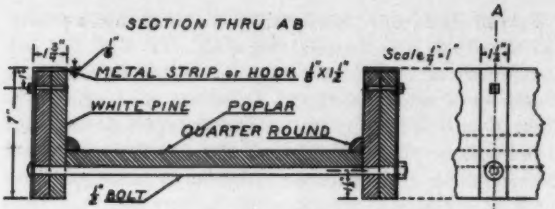


FIG 2.—A SLIDE DETAIL

the necessary holes were bored, a ½ inch steel rod was run thru the hook, thru the side, under the sliding board, and finally thru the side and hook on the opposite side, and the nut screwed on. See Figure 2. These bolts were placed 24 inches apart during the length of the curve and 36 inches apart beyond it. The holes for these bolts were bored one and one-half inches from the bottom edge of the sides. Such a construction is a little stronger than is really necessary, but it gives a method of accomplishing the desired result that is easily, quickly and cheaply done.

The bending of the sliding board to give the proper curve was the most difficult part of the shoot-the-chute construction. This could be accomplished by cutting, on what will be the concave side of the board, a series of saw kerfs one inch apart, and to the depth of one-third of the thickness of the board. The saw kerfs lessen the strains while the board is being bent and prevent it from breaking. But such a course mars the board. We steamed the boards instead, which is by far the better method when practicable. Before trying to bend the steamed boards, we first put the ½ inch bolts in the last two holes of the sides of the shoot-the-chute. Then, laying the steamed end of the board upon the last bolt and between the sides, the upper ends of the sides are raised until the board rests upon the second bolt. With the sides in this position, the board is clamped down upon the second bolt with large hand screws. This done, the sides are lowered to their original position and held there firmly while the upper end of the board is raised high enough to allow the third bolt to be passed thru the holes in the sides and under the board. Now the nuts on the first and second bolts are screwed up tight and the hand screws used to hold the board down on the third bolt while the fourth bolt is inserted in the same manner as was the third. We found that the board is apt to slide up from the bolts when the clamps are taken off. For that reason we began to nail the steamed ⅞ of an inch quarter round in place after the first two bolts were screwed up. But this is possible only by placing the blocks under the hand screw jaw a few inches beyond the sides so that the quarter round can, at any time, be placed in the corner where the side and board meet. See Figure 2 for the position of the quarter round.

If the upper edges of the sides tend to flare, when the nuts are screwed up on the bolts, strips of wood can be placed under the board over each bolt where the pull is greatest to keep the sides parallel. When the board is being clamped down upon the bolts, caution should be used in order to maintain an equal distribution of strains. Careless placing of blocks under the hand screw jaw may cause the board to crack on account of too much strain at some one point.

THE COMPLETED SHOOT-THE-CHUTES IN THE PLAYGROUND.

ORGANIZATION IN THE TEACHING OF MANUAL AND INDUSTRIAL ARTS

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TO anyone who has had much experience in teaching, or who has been a close observer of the teaching of others, it may be merely repeating a truism to say that organization in the teaching process is one of the great secrets of teaching success. There are three chief elements in the success of any teacher, viz., (1) personality, (2) knowledge of the subject taught, and, (3a) the ability to organize teaching material, and (3b) to direct the affairs of a classroom or laboratory in accordance with some plan of administrative organization.

Principles and methods in education may be spoken of as essential elements in good teaching. They are teaching means and when sanely applied to the everyday working conditions of a school they are indispensable in successful teaching. They may be regarded as the teaching tools inherited by the teacher if he is a socalled natural teacher or they may be teaching tools acquired by him thru years of study and practice. In any case they must be used unconsciously or semi-habitually to serve most effectively in the teaching process. Whatever may be the means of using them, they have a maximum value only when they are used thru the avenues of personality, knowledge of subject matter and organizing power, taken singly or in combination.

The strong personality of a teacher is an invaluable asset in securing initial attention and interest, but the actual effectiveness of it is soon shown in both an individual and a class by a lapse or even a total loss of attention and interest if a knowledge of the subject matter being taught is lacking. Likewise a teacher may have a pleasing and altogether attractive personality coupled with such a knowledge of his subject that he may be counted as a scholar. However, if he cannot plan his work so that it is sequential and progressive, he will fail as an expert teacher. Without the power of organization his success in imparting knowledge or in creating initiative and developing the power of analysis will be only commonplace. Especially will this be true if his subject is taught by means of motor manipulative processes, as in the case of any science laboratory work, drawing or shopwork. In these branches not only is the power to organize teaching material essential to success, but quite as much the power of administrative organization is demanded.

Teachers of laboratory work are likely to feel and often are wont to claim that their subject is among the most difficult to teach. There is reason for this, because not only is a knowledge of the subject necessary, but the power to analyze carefully the subject matter and organize it into sequential blocks and groups for daily assignments is essential. And, too, the ability to do effective administrative organization work or to build up a class machinery so that each member of a class will do his work as a thinking and self-acting individual and yet as an integral part of the larger unit—the class—is imperative if the greatest success in teaching is to result.

In support of these claims it should be necessary only to cite the examples of the business world. Wherever one finds a large and successful business enterprise he will discover upon investigation that the men in charge know the details of their business. It is so organized that every department and sub-department supervised by some one individual is a unit in itself; but like the link in a chain it is definitely related and often closely connected with some other link—another department. Indeed, such a closely related union of parts will maintain the efficiency in an organization even after the knowledge side of the business of one part or department has considerably fallen behind. This may be witnessed any day in a well organized retail department store. Comparatively few, of the army of clerks in such an organization, know the whole business or even their legitimate part of it, yet the support they have, merely by virtue of their relationship in a closely organized whole, does not permit their ignorance to interfere materially with the efficiency of the business as a whole. The momentum of the big machine becomes nearly if not quite a constant factor due to organization.

Again, in the efficiency of individuals one may find a sufficient guarantee of the value of organization. Why is it that men in leading positions in official, business or professional life carry their great responsibility? How is it possible for them to be prominent in seemingly innumerable enterprises of great moment? Is it not for the two reasons particularly? First, their ability to concentrate, as we say, upon one subject. Second, their ability to "farm out" jobs, and thus place responsibility, but at the same time finally and ultimately to be themselves responsible by means of a reviewing and checking-up system. In this the subordinate periodically reports to his chief, giving the results of the last plan followed and outlining the next plan to be undertaken upon which he must have the approval of his superior before action in developing the plan is taken.

If these conclusions are correct, then the assumption of this thesis is sound, viz.: that power of organization of subject matter, and power of organization for administrative purposes, are chief factors in a successful teaching operation.

If now the teacher is to be most efficient in his work, he, as well as the man of "big business" must be an organizer. Not only are the most successful large educational institutions manned by strong organizers, but the colleges within these institutions and the departments making up the colleges are each headed by a successful organizer. But we need not stop here, for each teacher in each department, in order that the department as a whole may be most efficient, must be a person,

Note—This is the introductory article of an important series on a phase of manual training, etc., never before treated in an educational magazine.

who, besides knowing his subject, must organize and administer it successfully.

It is for the purpose of enabling prospective teachers to supplement their knowledge of a subject with the ability to "turn the trick" in teaching it by means of organization that teachers' training departments have been developed in colleges and universities. The success of these departments depends largely, not so much upon the subject matter gained, as upon the knowledge of how to parcel out the subject matter in a sequential and progressive course of study and to build up a classroom machinery.

This is quite often evidenced by comparing teachers of the "old school" who did not have the advantages of a "teacher training" department with those of more recent years who have studied the mechanics of teaching as well as the subjects to be taught. It must be remembered, of course, in making such a comparison, that some teachers of the earlier preparation period have, by dint of their own natural abilities, acquired the organizing habit or, merely because of their great mastery of their subject matter, they command unusual respect, professionally, and consequently have a class following.

Two examples will serve to show the emphasis put upon organization by teachers representing each of the two sides in the comparison above made, viz.: teachers trained in subject matter only, and those trained both in subject matter and in the teaching of it. Example number one: Recently, in a conference called to consider the question of a training school for a certain class of teachers, the following incident was recorded. After all in the conference had apparently favored an institution which would strongly encourage the organization and administrative problems by individuals already recognized as students in their respective subjects, an elderly gentleman, a university professor, said, "Gentlemen, I have not as yet expressed myself in this meeting. May I say that after years of teaching experience, in my judgment, all that an individual needs, to teach successfully, is to know his subject thoroly from the beginning to the end?" When questioned as to whether a study of method would assist one materially in teaching, he expressed himself in such a way that there could be no doubt in the mind of anyone present that he placed no importance upon method and regarded as futile any effort to study method in teaching.

Another gentleman in the same conference, a product of recent years in a special training course for teaching, remarked, "First of all one must know his subject, but quite as important for the purpose of enlightening others regarding this subject is a knowledge on his part of how to guide others in the process of learning and achieving. No one can be assured of success in teaching if a knowledge of his subject is his only teaching asset."

Example number two: A young teacher of recognized ability after returning to his own institution from a university known the wide world over as among the best in several lines of endeavor, was asked by the writer to give his impression of his summer's work. He said, "The thing that impressed me most was the way in which the biggest men talked in and out and all around their subject, but without any apparent plan for developing it. If I learned one thing this summer that should help me in my teaching it was to plan my courses carefully so that I may know, if I follow my plan, that I shall at least cover a certain amount of definite subject matter in a sequential way within a given period of time."

Evidently there was in the mind of this already successful young professor the conviction that the power to organize teaching material is of value to the pupil. But for you and me—both teachers—let us be sure that it is also a valuable assistance to the teacher. It is a means of saving time and energy (physical, mental and nervous). For the pupil it serves as a road which passes the mile posts of attention, interest, reason and judgment, and leads to the goals of knowledge and achievement.

There are few means of accomplishment which do not have some disadvantages as well as advantages. It is possible to overdo almost any good thing. We can overdo organization by overorganizing. It can become a fetich. We may become so obsessed with the idea of system that all our energy will be used in organizing for the sake of system. Some have found that the card index method of filing has developed into a machine which took all of one's time to build and operate. Teachers have sometimes found that detailed courses of study and "plan books" have meant stereotyped and lifeless teaching. Instructors of shopwork and drawing have been guilty of developing record cards to such an extent that their attention was diverted from teaching to the keeping of records.

While all of these things are possible, still it is essential to know that with most of us there is little danger of over doing organizing work in teaching, but considerable danger that we shall underdo it by not doing it at all. This will be to the detriment both of our own efficiency and the development of those who are in our classes. At any rate, a wide observation of manual arts teaching may give one this feeling.

The relative value of knowledge of subject matter and the ability to organize may be shown in chart form. The curves in Figure I. on this page suggest the relationship existing between a teacher's knowledge of the subject he teaches, his power to organize his subject for teaching purposes, and his power to do efficient class organization work. It is probably true that exact data for such curves cannot be secured. No one can tell just how much knowledge one has of a subject, even by means of the most carefully prepared examination or the closest observation. Neither can one determine accurately the ability an individual has to organize either his teaching material or his class administrative means. The curves represent estimates only, but these estimates have been made after rather careful observation running over a period of years. They are made also as the average of individual estimates for a considerable number of teachers in manual and industrial subjects.

The vertical distances represent percentages of efficiency. The horizontal distances represent years of teaching experience.

It is assumed that the average teacher of the industrial arts starts teaching with approximately sixty per cent of the possible total knowledge of his subject that he will ever have. This, in some cases, may fall as low as fifty per cent or even less. If he is energetic and ambitious to succeed as a teacher, as is usually the case with one who prepares for teaching rather than enters the field accidentally, he will study diligently and hard for the first two or three years until he begins to feel that he is safely anchored in his subject. Then he may cease to study systematically and will gain in knowledge largely as a result of his casual reading, attendance at conventions, etc. The knowledge curve rises more rapidly, therefore, during the first few years than it does thereafter and perhaps never quite reaches the one hundred per cent mark.

The curve representing organization of teaching material starts rather low on the percentage of efficiency scale. Fifteen per cent is a liberal estimate of the efficiency a new teacher shows in initiating plans to develop his subject. He plans blindly at first and consequently haltingly. As a rule, for two or three years or even more, he uses the teaching plans of others with slight modifications. Then, if ever he is to show any ability in arranging his courses systematically, it is likely to manifest itself rather rapidly for a time and often as a result of some special work along organization lines, possibly done in a summer session. He begins to come into his own as it were, and for a few years his efficiency curve in semi-original and somewhat systematic planning of courses goes up rapidly. With the average individual, however, ability in this direction rarely, if ever, exceeds eighty-five or ninety per cent, while his knowledge of a subject may reach one hundred per cent, or nearly that.

The third curve, that representing administrative organizing ability, is somewhat more difficult to plot than the other two. If the new teacher has had some practice teaching of a constructive nature in a training institution, he may exhibit at first in his regular teaching something like ten per cent efficiency. Unless he is unusually gifted in picking up the mechanics of teaching, or has someone to supervise him who will suggest administrative organizing means, he will stumble along for a couple of years without making much progress in this most important aid to efficient teaching. Occasionally there is an exception to this rule. However, the average teacher in industrial subjects will begin to organize the physical means of teaching—such as the arrangement of tools in an orderly and easily-cared-for manner, the various systems of keeping records, the grouping of students in a class so that student responsibility may be best placed, the use of charts, partially completed demonstration projects, and other illustrative material, etc., etc.,—about the end of the second year. He finds this effort on his part so beneficial in a saving of physical and nervous energy that he expends it freely for another year or two when he has become a fair master of the situation in this element of his work. Perhaps he has reached seventy-five or eighty per cent efficiency by this time. From now on this curve will

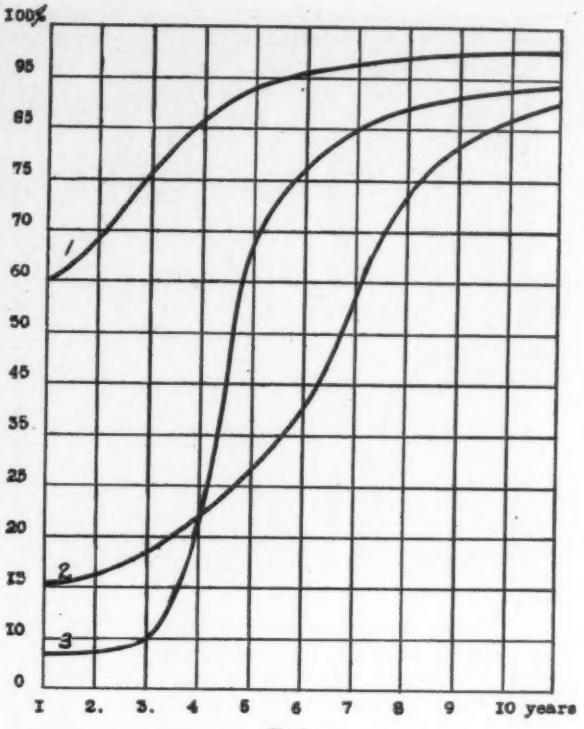


Fig. 1.
1. Curve of knowledge. 2. Curve showing ability to organize teaching material. 3. Curve showing ability in administrative organization.

rise slowly and approximately at the same rate as the curve of knowledge. For unless he is a genius in inventing class helps, his means of increasing his efficiency in this organization work will depend largely upon his getting from others, thru his reading, or by means of observation upon visiting days or at conventions, ideas which he will gradually carry out when he can find the time.

Perhaps the analysis of the chart curves will not be appealing. It is hoped, however, that they may be thought about longer than during the time of this reading. Compare the data for each curve with that of your own experience as a teacher and draw your own conclusions.

The result of a careful review of one's own experience in these matters, in the light of what has been said in this article, will lead one to strive, for his own sake, to make his curve corresponding to the lower one in the chart, No. 3, rise sooner and more quickly and reach a higher efficiency point than the chart curve. For the sake of those whom he is teaching he will strive also to improve his own curve, corresponding to the second curve from the bottom in the chart, No. 2.

For the student who has not yet done any teaching, except perhaps of the practice-teaching type, he will, of course, increase his knowledge of any subject which he expects to teach to the utmost, but he will certainly take advantage of every possible opportunity which in the future will enable him to organize the subject matter of his courses systematically and scientifically, and which will permit him to avail himself of every means

easily and effectively to administer the operations of a class in the multitudinous details of any laboratory type of work.

In future articles, examples of organization of both the classes herein considered will be given and explained both for teachers and for supervisors. The next article will deal with examples of organization of teaching material for the teacher of the manual and industrial arts.

The Tomato Girl Club and the Rural School

Rosa Naomi Scott, Knoxville, Tenn.

IF the rural school teacher could drop into a Southern state fair during August or September, he would find the Tomato Girls' exhibit the most popular and crowded spot. As he pushed with the crowd toward the exhibit he would realize that the Tomato Girl movement does not need to be pressed upon the public; the public is pressing upon it. Before reaching the exhibit the visiting teacher would be informed—perhaps two or three times over—that Walter Page, before he sailed for Europe, said The Tomato Girls' Clubs was the greatest movement of the present decade to keep people on the farm.

The first impression of the exhibit would be a workmanlike efficiency, far higher than the usual fair exhibit. The splendid display of fruits and vegetables in glass jars appears to be the canned goods section in a select delicatessen shop. The visitor is immediately informed that girls, between the ages of 12 and 16, have canned the display, tagged it (in beautiful script), placed it in order, and most significant, with their own hands they have raised all the tomatoes. The crowd in and around the booth, demanding information of supervisors and county superintendents force the visitor to await his turn for questions and answers.

"Are the canning clubs taught by the rural school teacher?" is about the first question asked. "Not exactly. The canning clubs are correlated with rural school work, and are in charge of collaborators and state agents, supervised by the government agricultural bureau. Sometimes the rural school teacher is a collaborator as well. Frequently she resigns teaching to become a collaborator or agent."

"Is the club work part of the school schedule?" "No," the inquirer is told. "The club meets at the schoolhouse, but after school hours. Much of the club work is field training, preparing the soil, planting the seed, transplanting and raising the plants. Demonstrations are given in canning the tomatoes. The Tomato Clubs give a practical agricultural knowledge, correlated with domestic science and other school work. In this way the clubs are vitalizing the whole of the rural school and the rural school community." Here the visitor will be invited to a canning demonstration, to take place at a certain hour, out-of-doors—where four girls from one county compete against a similar team from another county for prizes, given for rapidity and scientific canning.

You are advised to go early to get a seat. You go early but you don't get a seat. The benches provided for spectators are jammed, and a rope is being stretched around the space reserved for the demonstration to hold off the standing crowd.

For a demonstration is a novel and pretty sight. It is always out-doors, under trees or in a tent. In the background stand the tomato canners, square, zinc-like stoves, that pour smoke from a small, high funnel. On inspection you see the lower half of the canner holds burning wood, and the upper half is merely a huge boiler full of steaming water. Out-door cooking is fascinating, but a large part of the crowd is attracted by the actors, the fresh country girls in picturesque caps and aprons, who put on the show. Shy, but not awkward, they face the buzzing audience with the old-fashioned charm of modesty. Always the crowd applauds spontaneously as they take their place behind the tables.

On the tables are the empty cans to be filled with tomatoes, granite pans, corers, paring knives, and tomatoes in tin baskets. These baskets have wire bottoms, and fit into the canner boiler. Beside them are long steel hooks to lift the baskets from the boilers. As the girls take positions behind the tables, the State agent calls time. The moment the contest is on the girls show they know what to do so well that they can do it under the gaze of hundreds. With the wire hooks the baskets of tomatoes are seized and dropped into the steaming canners. This is the blanching process. When the tomato skins pop the baskets are whirled back to the table and the girls peel them dexterously. Thereafter the girls work singly, one peeling, one coring, one packing, and one, with swift sureness, sealing. In an incredibly short time they have cans packed, ready to seal.

Sealing is the prettiest operation of all. A filled can is placed before the girl who seals. She takes up a small tin lid—manufactured with a rim of soldering—and places this lid over the opening in the can. Dipping a brush in liquid soldering, she swipes the meeting edges of the lid and can, thus causing the solder to flow. Then with a sealing iron—drawn hot from the fire of the canner—and a pretty movement that lifts her arms in the air—she presses the hot iron firmly on the top of the can. The middle of the lid is pricked, and the final touch is closing this prick with "tipping irons." The girls accomplish the sealing as easily as they peel the tomatoes.

An hour from the moment the girls began blanching the tomatoes, the cans are lifted from the canner, a product ready for the market. Scientific preparation makes these tomatoes the best on the market. Acids, that are used in many brands of canned fruits and vegetables, and that are supposed to cause sudden death, are

A TYPICAL TOMATO CANNING CLUB SCENE.
Picture taken in Sallie Mountcastle's yard—A Tennessee Prize Winner.

never used by the tomato girls. Every article, every can is sterilized, and the cooking is scientifically exact. The rapidity of the process is also notable. In the demonstration the girls often can 23 cans in an hour. At this rate, in a day, one tomato girl, with her canner can provide enough fruit to supply her family for a season.

While the tomatoes cook, the state agents, county superintendents and other speakers show the audience that the profit, the agricultural training, and the correlated studies of the canning clubs make them one of the most important of recent advances for the rural school. A bit of tomato club history is always given as a preface, for every one is greedily listening to hear how and when the clubs began. Our visiting teacher hears briefly the following facts: The Tomato Clubs are three years old. They are a branch of the Boys' Corn Clubs which, curiously, were a direct result of the late Dr. Knapp's effort to kill the boll weevil. For this and other advances Dr. Knapp organized the farmers. The government saw a future in the organization and the Agricultural Bureau took it over.

Dr. Knapp soon saw, however, that to get a progressive farmer he had to catch him young. To do this he had to interest the boy in the farm, and thus keep him there. For this purpose the Boys' Corn Clubs were organized.

But interesting the boys, Dr. Knapp soon recognized, did not keep the people on the farm. The root of the restlessness lay deeper. The only creature who never rested, who drove and dug from 4:30 in the morning till after the supper skillets were washed, whose shelter and feeding no agricultural bureau, and no farmer ever considered, was the woman on the farm. Lean-jawed, hollow-chested, hooked-shouldered, joyless, shut in to hard manual labor, monotonous as jail life, no past to look back to, no future to hope in, she was the only living farm-atom who did not quicken with spring or rest with harvest home. Yet her toil brought no pay envelope. Girls on the farm were escaping to factories and stores to get the pay envelope. Even this doubtful escape seldom came to the farm girls. Generally there was nothing for her but to marry the first green-horn and "settle down" to repeat her mother's tragedy.

"You must change *that,*" Dr. Knapp said to the teachers who gathered round his movement to correlate it with the rural school. "You must make life better from the woman's standpoint or we cannot keep people on the farm. You must begin with the girl."

Little Miss Marie Samuella Cromber in South Carolina did begin with the girl—and the tomato. Miss Cromber had a fine eye for economic values. She saw the farm girl needed above all else, money, and she saw the possibilities of the tomato to furnish this money.

Canned, preserved, pickled, "chow-chowed," raw, the tomato is the queen of vegetables.

It was up-hill work, however, to organize the first tomato clubs for the farmer saw nothing in them. Fortunately Miss Cromber had the courage that can't recognize defeat. Then the government came to her aid, and provided state agents, who thru the rural schools gave scientific instruction in tomato culture and canning —from preparing the seeds to an attractive label to be gummed on to the canned product. A canner costing from five to fifteen dollars was put on the market. This was operated with a little stove wood, out-doors, thus escaping kitchen heat—and the interference of "Ma," and back-woods methods.

From the beginning the girls made money. The first year, in Tennessee, a girl of 15, living in a two-room cabin, made $156. This past year she received the significant prize of "all expenses paid," for the freshman year at the University of Tennessee. Myrtle Hardin, also a 15-year-old girl, earned near the hundred mark the first year and every year since has won prizes

like stripping ripe tomatoes from her plants. Last winter, one of her prizes was a trip to Washington, where she presented the President and the agricultural chief with a can of her now famous preserved tomatoes. Prizes are merely a side crop, you understand, on an especially good crop. Girls reporting a poor crop make fifty dollars a year. All Tomato Girls, raising any kind of a crop, make money. This fact has beaten down the farmers' prejudice. Girls with a prospective tomato crop can buy a canner and cans on credit at the rural store. They always pay for the canner the first year and have a margin left.

SALLIE MOUNTCASTLE IN HER TOMATO PLOT. A PRIZE PLOT.

Money to farm girls is what Miss Cromber saw it would be—an opportunity for education at a time when education will lift their after life. Nearly all Tomato Girls save their money for better education—frequently agricultural education.

Because Tomato Girls make money, the clubs are sweeping from the cotton states to the Middle West, the West, the East and North, and even beyond America. Germany and Australia have asked Dr. Bradford Knapp to come to them and organize the tomato clubs in their countries.

And the Tomato Girls save money. "Save the surplus" is one of their slogans. They can fruit and vegetables that would otherwise go to waste on the farm, and keep the winter pantry supplied.

The supervisors also help the girl to find a market for her canned product. The canning label provided for the girl has a blank for the canner's name, thus giving each girl an opportunity to build up an individual market.

Besides sure money the clubs give a wide agricultural training. The girls specialize on the tomato but they are not confined to this. They are trained in the culture of all vegtables and fruits, and in sub-soiling and treatment of the soil. The latest tested agricultural science is passed directly to them and in such practical form that it becomes an object lesson to the community. At first the farmer thinks the girl gives too much time to her plot, but when he sees one-tenth of an acre yielding from $100 to $150 he is converted to intensive farming.

There is much besides tomatoes and money that the canning club yields, both in the rural home and in the school. It draws the farmer and his daughter together. The father generally plows and harrows her plot—tho she is required to pay him ten cents an hour for this assistance. It is inevitably sure that the father becomes more interested as the work unfolds and its results are seen. Farmers are usually proud of their daughters, but cooperative work makes a farmer recognize a helper in his girl, and in himself her helper.

The girl today is receiving a new idea of her father and the farm. The canning clubs are bringing the girl to the farmers' conventions. The Home Makers' Section always brought some women to the conventions but the canning clubs have vitalized this attendance. Two hundred come where formerly fifty came, and their part on the program is the star performance. These conventions held frequently in university buildings and in a university atmosphere, are addressed by agriculturists of note and give the girl a vision of the possibilities of farm life. She sees that it is a dignified life, and that her father's occupation is linked with professional scholarship.

But the best correlated result of the tomato clubs is bringing the interests of the rural school and the farm into one. The poor farmer has always struggled to keep his children from the rural school, to help at home with farm work. The canning clubs are making the rural school the farmer's assistant, and farmers, understanding this, are bringing their children to the schools that furnish this training, and assisting to make the school

progressive in all its work. Rural schools in many counties have been revolutionized by the canning clubs.

The domestic science that is correlated with the club work, trains the rural girl in the art of homemaking in her own place. Sewing is taught in connection with the necessity of cooking caps and aprons and a costume for garden work, similar to one suitable for a hike is encouraged. The peculiar needs of the country home are considered in the domestic science taught, in the labor-saving devices, in the methods of producing comfort and beauty in and about the farmhouse. The stress laid upon homemaking is clearly indicated by some of the objects of the club:

"To provide the view-point and education necessary for the ideal home.

"To help the girls furnish the home with fresh and canned vegetables.

"To encourage rural families to save the surplus products.

"To make home attractive, interesting and helpful, and to make less the dissatisfaction of wives and daughters."

"Make the best better," means to make the home—the best of all better."

The clubs are making the rural school a community center. The canning demonstrations that the rural schools give are often attended by 500 people. The house itself is kept open all summer for the use of the club, and is a veritable country club house. The girls frequently give pie and ice cream socials for money to buy their canners, a contribution to the social life of the community.

Any one can organize a Tomato Girl club. The rural school teacher usually does it, but in some communities a progressive farm woman makes the advance. The first step in organizing a club is to write to the Agricultural department at Washington, addressing Mr. W. B. Martin, who has charge of the Boys and Girls work, or Mr. H. O. Benson, whom collaborators call a "live wire" in the canning club work. These gentlemen will put the applicant into immediate touch with the organized work in his section, or give detailed instruction about the organization of the work. The work is being organized in the Middle West, the West and the North. As already stated, the work is in charge of collaborators, supervised by state agents. These collaborators have had public training or training as teachers. The majority have been, or are teachers whose work has shown vitality. The question of salary is worked out by each section. Generally the government pays part and the county board of education pays part. One collaborator is appointed in each county to organize clubs. The number of clubs in her charge and the members in each club are limited so that she may give her individual attention to each girl and her tomato plot. The collaborators are engaged for two, four, six or twelve months. As the clubs grow and interest extends the collaborator's term lengthens. Some collaborators are rural teachers, while some are resigning to give their whole time to the rapidly growing work. It is particularly a work for the rural teacher to take up. That it is growing every farmers' convention and state fair and agricultural gathering attests, by the phenomenal popularity of the canning club features and the presence of the Tomato Girls. In communities where the work has been introduced the extension of the work continually demands more collaborators.

It is the first opportunity the farm woman has had for industrial and intellectual independence, and like all truly big things, it is so simple and so adequate, contributing to every side of the country school and the country community, that we can only wonder why nobody thought of it before. To a teacher not satisfied with conventional teaching, it offers the challenge of a new field, with a tremendous future. It is no longer an experiment. It has made over the rural schools where it has been introduced, and its significance and its territory increase not weekly but daily.

A Canning Demonstration by Country School Girls at the National Conservation Exposition in Knoxville, Tenn.

Delivery of the 125,000 pounds capacity cupola used by both the foundry men and the students. Student work was poured at the same time as the regular work; students generally taking places as helpers to regular foundry men, shifting weights and jackets.

A SCHOOL FOUNDRY THAT CO-OPERATES WITH THE COMMERCIAL SHOP

N. F. Fultz, Director of Industrial Arts, Anderson, Ind.

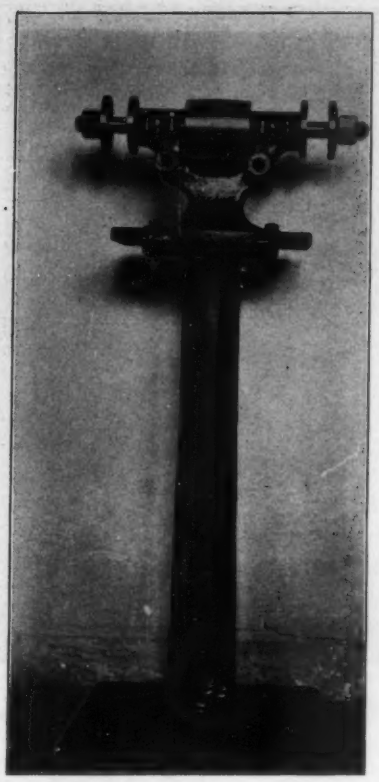
TWO years ago the public school shops of Anderson, Ind., faced the problem of meeting the demand for foundry practice as a part of the regular Industrial Arts work. This year they finished the second year of a relation established by contract between the schools and a local job foundry, doing a large and highly skilled line of work, which has been pronounced highly satisfactory by both parties and is one unique solution of that vexing school question—the school foundry.

The problem as it presented itself to the school authorities two years ago contained all of the elements of the question that come to any school of its kind. The development of the newly inaugurated Industrial Arts work in the Anderson Schools made the foundry work imperative. The spirit of the present educational day was upon the people so that the adjustment, however made, must meet the practical test. It was made clear that whatever was done in the matter, the ultimate result must be such as to pass the inspection of the man who would know—the manufacturer of the city. A newly completed high-school building had neither the room nor the special arrangements for housing a foundry and lack of funds prevented the building of a special building, however small.

From the above it becomes clear why the men upon whom this matter rested for adjustment began to cast about for a foundry near enough at hand for convenience and one with a capacity large enough that a class or section of high-school boys might be assigned to a floor space or distributed by schedule among the departments of the plant.

We found that the business man is usually willing to meet the school half way in its troubles. This is true, however, businessmen frequently misunderstand the motives of the school. Its purposes and viewpoints are often misunderstood but often very accurately analyzed and justly "panned." No matter what a schoolman asks from the businessman or manufacturer it must be done from his, the businessman's standpoint. It must be done with a clear understanding of his plant and his policy. It goes without saying that, if a man has a well organized and highly specialized working group of workmen, he will approach very cautiously a proposition that would place a group of high-school boys, however small that group might be, on his floors. That in itself becomes a serious stumbling block from more than one angle. Take the one that arises from the possible attitude of the foundry man at work in the plant. He is a suspicious individual on that score and it was up to some one to lead him to see—when the time came later—that these boys were not to be played against him and his prosperity. These things and others may be the beginning of a period of inefficiency for his plant if he should enter into an arrangement of this nature.

All of these considerations were well in mind when the manager of the foundry, with which the contract was made, was approached by the school people. It was an especially fortunate circumstance that this man was a university graduate, fortunate, because he seemed to add to his viewpoint as businessman that of wanting to assist in solving a difficult educational problem. An understanding was soon reached whereby a schedule was arranged for high-school boys in squads of six or less to be worked on the main floor of the foundry. Their tasks were to be performed under the direct ob-



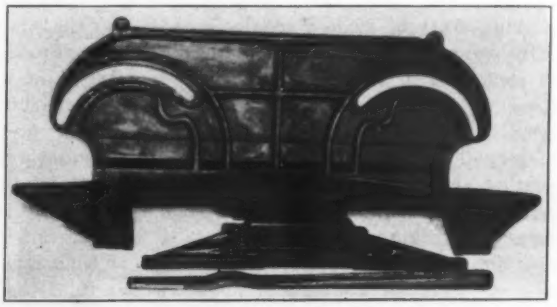
Complete Buffing Wheel and Emery Stand. Patterns, core-box and castings made by students.

servation and instruction of a foreman. All patterns made in the school pattern shop were to be worked first and as many duplicate castings taken as needed for the consumption of the school machine shop. These castings were to be paid for at the regular commercial rate discounted at twenty per cent. Time of the foreman given to the instruction of the boys was to be paid for at the regular schedule of wages, by the school. The regular equipment of the foundry with the exception of the hand tools were to be used in the work. It would be an untruth to say that things ran without a halt or a jar from the first, for they did not. The scheme was new and some of the details that arose presented serious problems. The whole scheme was entered into in the spirit of an experiment. It is fair to say that there was a wholesome amount of charity and patience displayed more than once by all concerned. Being a foundry run on the piece work system, the first lesson for the boys, when they went into the plant, was that they must avoid any move that would cause a loss of molds and therefore of time and money. They entered into the spirit of the situation, and as time passed they learned to lend a helping hand to this workman or that one by giving a "lift," cutting sand and "shifting" during the pouring time. For this attitude on the part of the students the workmen soon began to give them little "kinks" and advice that go to make successful molding. The greatest result, from the standpoint of the success or failure of the scheme, was the spirit of confidence that was instilled. The matter of adjusting the time of the foreman, responsible for the instruction of the boys to the needs of the class was no small one. His first consideration is the plant's output. Whenever that call came, the boys would be the second consideration. During the two years of the operation of the scheme this has proven the most vexing element to meet. The solution will likely be that a regular molder will be given the assignment and work under the direction of the foreman. Here the same old problem of finding an excellent mechanic that will be a good teacher enters. It is not an impossible thing but the odds are against the success of the plan. Another item of annoyance is the number of delays that happen in the course of a school year, like breakage, shortage of coke or pig iron, shortage of molders (no small item), which ties up the foreman's time, etc. I mention the above facts, for anyone giving this scheme consideration should have them in mind. To a certain extent they are not easily remedied —if at all.

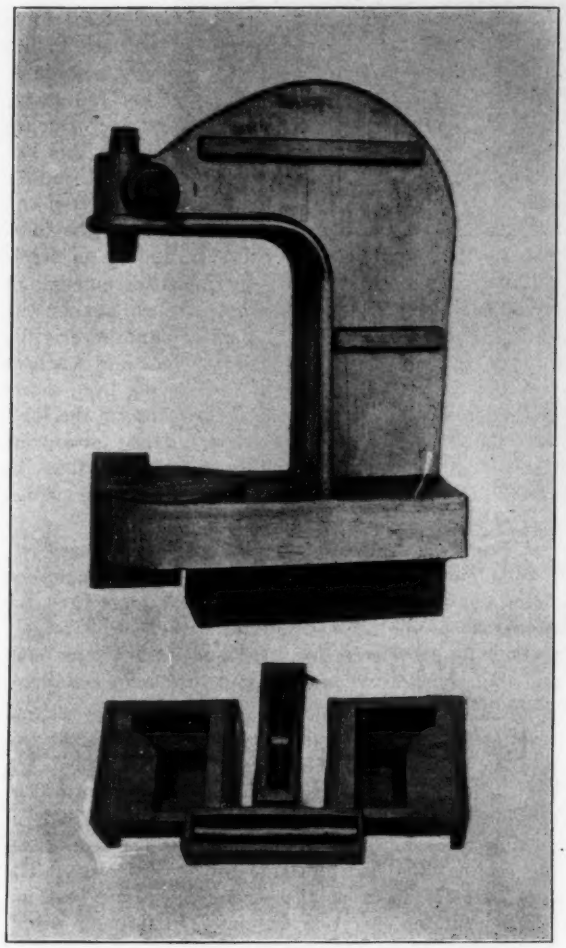
From the beginning the plan was to give each boy a full foundry experience but on the other hand no claim was made that he would get any more than the rudiments of the trade. Molding as a trade is largely marked for its success by speed and dexterity of hand and that comes from practice and then more practice.

Each boy "did time" in the sorting and rattling room at least two scheduled days a term and as early as possible in his experience. There he learned to pick a bad casting even before it goes to the rattler. The classification of castings for the rattler on the basis of possible breakage came to him. He took his turn brushing castings too frail or large for the tumblers. The time actually spent at the several operations was not lengthy but the operation was followed thru the grinding and weighing room to the time that the finished casting was ready for the shipping clerk. Thereby a student came to know what was expected, in a commercial way, of the foundry. The experience proved more than worth while from the knowledge acquired of gating, parting and "bobbing" by observing the markings on the castings. It thereby made the matter of building a mold more comprehensive to him when the time came.

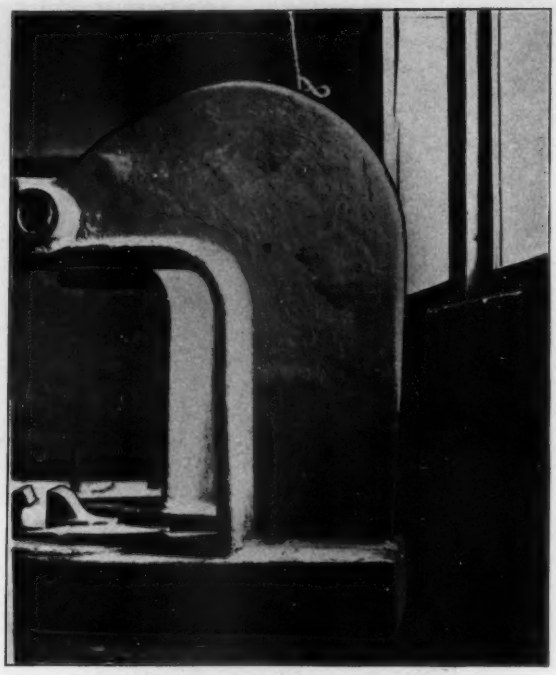
From the rattling and grinding room the student was scheduled to the cupola charging, and each boy



Set of Patterns for a Wood Trimmer. Made by one boy and worked thru sand by another. Pronounced by local pattern-makers the equal of any shop out-put.



PATTERN FOR 16-INCH ARBOR PRESS AND REQUIRED CORE BOXES.
Made by one boy and "headed" thru the foundry by him. Two arbors finished by boys in the machineshop will remain there. Others will be sold locally.



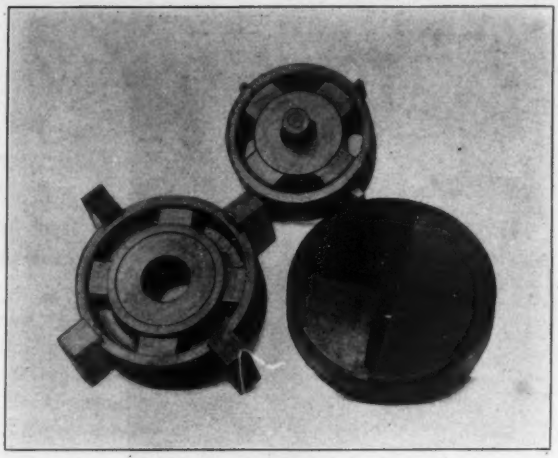
CASTING OF ARBOR PRESS BODY.
Made by boy who completed patterns, shown on this page.

stayed with the cupola tender from the time that the large furnace was "mudded up" until the dump was made after the run. He broke pig, wheeled scrap and coke, weighed and sorted, noted for report the proportions and manner of charging and watched the heat and its action on the coke and iron.

A limited core room capacity which was always working overtime made a regular schedule for the boys there impractical. Notwithstanding they were thrown in contact with this very important department of a foundry. All cores made for patterns used by students were made under the instructions of the head coremaker. They were given detailed instruction in wiring, venting and the mixing of core sand. They made observations of the operation of the ovens while their own cores were baking. Ample opportunity for observation into the most intricate core making was to be had in the core room for the foundry did a business in casting locomotive headlights, six cylinder automobile manifolds, computing-scale bodies and gas regulators. The full importance of core making to the founding business is realized by all concerned and one thing that we shall work to is a development of a scheme whereby the student may spend more time in the core room operations.

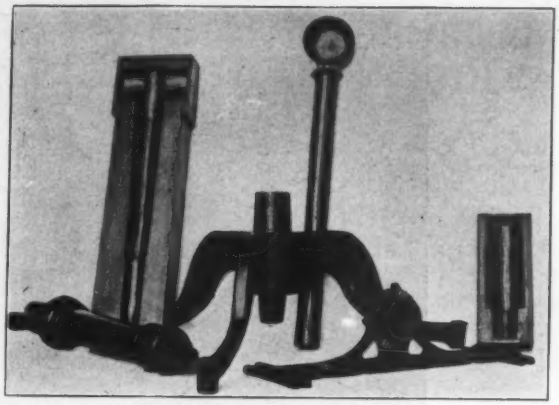
As has been stated before, the first year of the operation of the scheme was done on the main floor of the foundry. Both floor and bench work was done by the students with the workmen at their own assignment. This was valuable from the standpoint of observation, but the feeling on the part of the management was that it handicapped the actual output. It was therefore decided that the school should build an annex in which all of the actual molding by the students should be done. A lot directly across an alley from the cupola was leased. A cheap frame building was planned and built by the instructor and boys who were to occupy it. Every attention was given the matter of light which is a most important item in the foundry. Students made all of the large floor flasks, rammers for both bench and floor. So far as it was possible the responsibility of equipping the foundry was met by the students. During the year just closed patterns and castings for full sets of "trimmings" for snap flasks were made and another year will find the foundry equipped with snap flasks made by students. Before, the foundry had furnished them.

The following list of castings made during the year will give a general idea of the nature of both the floor and bench work done by the students: emery grinders, gas engine parts (not a complete set, however, up to date), wood trimmers, independent chuck bodies, drill press, vises, playground equipment, trimmings, dumb bells and shots for gymnasium, speed lathe face plates



Pattern for a 10-inch Independent Chuck for an Engine Lathe and a Pattern and Core Box for an 8-inch of the same.

Several castings have been taken from the smaller size. Plans are to equip the shop, at a raw material cost of perhaps $1.75 each, with a full line of chucks, thereby eliminating one of the most provoking dead-weight costs that come to a machineshop while the students, from the drafting room to the boy who puts on the last rub with the buffer, gets a rare commercial experience.



Complete Set of Patterns and their Core Boxes for a Drawing Stand. These are being worked at intervals in the foundry and then finished in the machineshop. They become a part of the regular school equipment.

and chucks, surface gauge bodies, house jacks, arbor press bodies, drawing stands and seat pedestals, bench plates and milling machine fixture bodies, etc., etc. The output was sufficient to keep a ten-student machine shop running for the day and night school, in so far as castings were required.

At this point it is well to note a policy in the regular course of shop work that is different from the average in the respect to be mentioned. Three terms' work in patternmaking is required. The first term, a student spends two days per week in the drawing room, one day at the foundry and two at patternmaking. In the last two terms, two days are scheduled at the foundry, and three, at patternmaking. No credit is given for a pattern until it goes into the sand and a good casting results. This is done on the basis that the two processes are allied in their beginning to the extent that they must go hand-in-hand and that a pattern is not a pattern until it goes into the sand and shows a castable mold—no matter how pretty the pattern may be while in the hands of the maker. It does not take a great many trips to the foundry for the boy to see how worthless his pattern is if he has not made ample provision for the molder to work it. While it may be said that such a procedure may develop too much into a molders' standpoint, the fact remains that the value of a pattern is wholly determined by its performance in the foundry. All patterns are made from blue prints that originate in the drawing room. These drawings are not of necessity made by the student who is to make the pattern but when the pattern is made its maker is supposed to get the first mold from it.

The list of patterns mentioned above indicates the scope and field of the work. Not one pattern is made but that goes into the sand for a casting that is utilized either by the boy or the school plant. Abstract patterns for the sake of the practice or principles involved are outlawed. The same principles are to be found in a pattern that delivers a casting with a value. It happens that no two terms' work are identical. To illustrate: during the term closing the past school year, second term patternmakers worked a full set of patterns for rapid acting vises. As these patterns came thru the sand these castings were worked into the finished job and they will replace some antiquated vises that have been in use for some time in grade shops. Next term another and different project will be worked.

In doing their foundry work the students were seldom accompanied by anyone from the school. While the method of instruction there was not greatly different from that in vogue in school foundries elsewhere, the scheme to maintain a common understanding between foundry and school shops and to check on the boys is, perhaps, noteworthy. A written order was taken by a member of the squad from the school instructor to the foundryman. Patterns to execute the order were sent with the boys. A time card for each boy was filed at the foundry. Items listing all of the possible foundry activities were arranged on this card with suitable spaces for punching. As a student completed the day's work he presented his card to the foreman for checking. The responsibility for having his card punched for every operation was placed upon the boy. The school instructor in patternmaking by referring to the card gathered the data that assisted him in computing the boy's monthly grade.

Much of the success of the scheme as a whole depended upon the amount of "nursing" that the school folks gave it. Being their problem, it follows that interest and enthusiasm must largely come from them. Someone from the school was about the foundry as often as possible. The workmen grew so accustomed to the fact that they took the teacher as one of their number. Their work and their problems were discussed with the teachers at every opportunity. Too much cannot be said of the excellent spirit of the men of the plant and their general attitude toward the "High School Kids."

The scheme, judged by its two years' operation has the following advantages: (1) It places the boy with his work in a "commercial atmosphere." (2) It gives him the advantage of observation and tutoring at the hands of a foundryman, who knows and therefore gives

SCHOOL ANNEX TO THE FOUNDRY SHOWN TO THE LEFT.
The foundry is to the right, the brick wall being the corner of the core-room of same. The picture was taken at "house cleaning" at the close of the school term, hence the appearance of the alley.

the student a feeling of confidence in his work. (3) His patterns receive the absolute test of value at his own hands and before they have left his mind. He therefore becomes his own critic of work. (4) It is an economical solution of the school foundry problem. (5) The student by his association in the plant becomes something more than a "greenhorn" and with a few exceptions he would be given the preference by the manager of a foundry hunting a young fellow to start into the work. Do not understand this as a hint that he has mastered a trade for he has not, because the time limit about the plant is too short. But that is the only reason so far as I can see why this could not be claimed.

The disadvantages as shown might be ennumerated as follows: (1) Difficulty in maintaining a working relation between the school and foundry. The regulations of the plant cannot be changed at all to meet that of the school; therefore, in carrying out any schedule, the students must of necessity be somewhat irregular at times at school. Nothing but charity and indulgence will get past that point. (2) The losing of direct control of the students even for a short time. Nothing but the development of a feeling of personal responsibility on the part of the student can overcome this. (3) The drawbacks of a day's operation as they come to any foundry, such as shortage of coke, iron or men, become the drawback as well of the student's schedule; a thing that is wholly beyond the power of the school people to remedy.

There may be other advantages and disadvantages not noted and possibly others in store that the experience of two years could not bring forth, but the conviction is among the people with whom the scheme developed, that it has been worth while to the boys of the Anderson School shops and might be to others should the plan be given a trial elsewhere.

Every one who ever did anything anywhere had to find the grindstone and run himself against it until he developed an age that would cut something. Half of greatness is grit.—*Kaufman.*

CONTINUATION SCHOOLS: SHALL THEY BE GENERAL IMPROVEMENT SCHOOLS OR VOCATIONAL SCHOOLS?

Warren E. Hicks, Madison, Wis.

AT the outset, the question uppermost is, "What are Continuation Schools?" Has the term a commonly accepted meaning? A confusion of thought is apparent in the current literature dealing with all new school topics. So serious has the need for a standardized terminology become, that it is receiving the attention of our national societies. The state and national administrative officers are endeavoring to get together. The situation is as chaotic as the Mexican tangle. Out of the chaos, it is hoped that there may be a peaceable understanding without mediation.

General Improvement School.

But what are Continuation Schools? A recognized authority has recently declared that a "Continuation (or part-time) School is a day school which requires that the pupil attend a portion of the working day, during the rest of which he is regularly employed." It is not necessarily a vocational school. Its aim may be to continue the general education of the pupil. As such, it is non-vocational. As such, it is a general improvement school.

Vocational Schools.

What are vocational schools? The same authority announces that "Vocational Education is any form of education whose aim is to fit an individual to some definite degree to pursue effectively a recognized profitable employment, given only to persons who have already determined their aim to enter such employment, or who are already engaged therein and who wish to increase their efficiency in their chosen occupation." From this definition it follows that a Continuation Vocational School is a trade extension school.

It is noted that the trade extension instruction may take one of two forms. First, the form of instruction that is restricted to indentured apprentices in the trade taught, or second, the form of instruction given in a trade or occupation not followed by its pupils during the balance of the working day. This second form of instruction may be called a Trade Preparatory School.

Studies That Are Common to All.

It is prudent to accept these definitions in this discussion. At this point, an inquiry is made whether these three types of schools, viz.:

1. The General Improvement Continuation School,
2. The Trade Extension Continuation School,
3. The Trade Preparatory Continuation School,

have any studies that are pursued by all students in common, and what those studies are. Fortunately, the answer to this inquiry is made, so far as it relates to Wisconsin—and Wisconsin material is drawn upon freely—by the terms of the law. The General Improvement Continuation School pupil is to be taught English, citizenship, sanitation and hygiene, and the use of safety devices. The Trade Extension Continuation School pupil is specifically directed to devote two hours a week to instruction in English, in citizenship, in business practice, in physiology, in hygiene and the use of safety devices. This is also true of the Trade Preparatory Continuation School. The studies of all three schools are, therefore, common for two-fifths of the time that they are in session.

Studies That are Not Common to All Schools.

In general, the Continuation, or part-time day, school is in session five hours per week for each pupil. Two hours are devoted to the prescribed studies just named, and three hours are open for studies not common to all schools. The Director of Continuation Schools, therefore, has the privilege of determining whether these three hours shall be given to general improvement instruction, or to trade extension instruction, or to trade preparatory instruction. It must be assumed that all three of these schools are established. No one kind will serve all the individuals who are required by law to attend. It is the theory of these schools that they are maintained to serve the individual, and not groups of individuals. The groups are very small in order that personal help may be made effective.

The Process of Registration.

Since the function of teaching is helpful service, and that is pre-eminently true in Continuation Schools, the question to be determined when pupils enroll is whether they are to be assigned to a General Improvement Continuation School, or a Trade Extension, or a Trade Preparatory School. An indentured apprentice makes application and he is readily assigned to the Trade Extension School. His aim is determined and he is already engaged in a chosen employment. Whether the apprentice is indentured as a salesman, carpenter, machinist, painter, waiter, engineer, printer, blacksmith, mason, barber, plumber, shoemaker, baker or other occupation, the decision is easily reached that a closely related and correlated trade extension course should be prescribed for the three hours. These apprentices all wish to increase their efficiency in their chosen occupation. It is admitted that many of these trades are recognized profitable employments.

Courses of Study.

In comparison with the whole number of people employed in the trades the number of indentured apprentices, that is, apprentices who hold written contracts with employers, is distressingly small. The alleged apprentice, as a rule, has only an oral agreement, if any at all, and therefore, gets his instruction, if he gets it at all, after working the full day, by attending trade extension evening classes. The course of instruction that discriminates sharply between the three hours' trade instruction that should be given to an apprenticed plumber and the three hours' trade instruction that

should be given to an apprenticed baker, is a generally recognized need. Not that such courses are not prepared, not that they are not in themselves excellent courses, but rather that the employer and the alleged apprentices do not recognize that such courses are available for the apprentices, and that such courses are worth while. Instead of cooperation in this matter, unfortunately we have the frequent paradox of both the apprentice and the employer being opposed to the written contract for apprentices on the same theory, viz., that the law is unfair. In the mind of the employer, it is unfair to grant an apprentice day instruction; in the mind of the apprentice, it is unfair to expect him to remain two, three or four years in employment under a stipulated contract. At this date, only the far-seeing employers and far-seeing workers are entering into written contracts.

Campaign of Education.

Herein lies the need of a campaign for helpful education to the worker. It must be conducted with moderation and care. The united efforts of employers, workers and school forces will bring about improvement. The growth may be slow. It may not be spectacular. The time is already here, however, that when any worker shows that he has the fire within him to be more efficient in his occupation, he does not need to go to the evening class instruction. He may get it in the Continuation Trade Extension Day School, and he may get it without loss of wages.

Girls' Attendance Voluntary.

Shall we pass to the consideration of the school for the girls? Girls 14 years old and older who are in domestic service and who enroll in the Continuation Day School are assigned without much question to the trade extension instruction in home-making. Sewing, cooking, home-dressmaking and home-millinery, house decorations, marketing, etc., all are activities that train for the life efficiency of the members of this group.

Girls in Factories.

Girls under 16 years, employed on labor permits, call forth a more complex problem. Here in Wisconsin we have a group of about 4,000 girls with an average age of 15 years, in fairly good health, earning approximately an average wage of a little more than $3 per week, working either constantly standing or constantly sitting, for 48 hours per week, and the majority of them live over a mile from their work, to which they walk. They are employed in candy making, canning and bottling, hand finishing and sewing for tailors and knitters, spinning, spooling and winding, machine knitting, taping, net weaving, turning gloves and linings, pasting and labeling, cash and messenger service, etc., etc. The question is, what kind of a Continuation School shall be provided for them? Here are the three tests to be applied:

Can we say that they are engaged in a recognized, profitable employment? Can we say that they have made a choice of occupation? Can we say that they wish to increase their efficiency in the chosen occupation?

MR. WARREN E. HICKS
State Director of Industrial Education for Wisconsin, Madison, Wis.

The case of each girl needs to be passed upon separately. When the three test questions can be answered in the affirmative, it becomes the duty of Continuation Schools to provide the trade extension instruction. When any one of these questions is answered in the negative, the duty of the school is to provide either the Trade Preparatory Course, or the Home-making Course, or the General Improvement Course.

With these girls scattered in forty cities in Wisconsin, with the various employments in each city and the girls coming to school on a schedule of attendance that accommodates the employers, it is manifestly easy to know that teachers, in the beginning, have done the obvious thing and emphasized the Home-Making Courses. Later it may be expected that more Trade Preparatory Courses and Trade Extension Courses will be developed. They may be limited in number and located usually in the larger centers.

Constancy of Employment.

The people who have dreams that these permit girls should have trade extension courses exclusively, get a shock when they learn that out of the 4,000 girls, 500 hold the same job less than one month; 1,000 hold the job less than three months; 1,000 less than six months; 1,000 less than one year, and that barely 25 hold the same job for two years.

It may be added that of the 4,000 girls, approximately 500 may be classified in the established schools in the fifth grade or below; 1,500 in the sixth; 1,000 in the seventh; 500 in the eighth; 500 above the eighth. Sometimes this information is used to justify a General Improvement Continuation School. The presumption ought to be that the established schools have done the academic work well, and that the Continuation School ought to do vocational instruction when it is justifiable.

Selected Groups for Trades.

Manifestly, a few of these girls, in certain selected groups, may be led into skilled occupations thru the activity of Trade Preparatory Courses of instruction.

They may become trained servants, dressmakers, saleswomen, laundresses, nurses, housekeepers, milliners, stenographers, clerks, telephone operators. These are recognized profitable employments. There is a body of information necessary to be understood in order to receive promotion in these employments. Promotion is possible and a living wage is usually paid to workers in these occupations. When, therefore, in any city, a select group of girls can be trained by the Trade Preparatory Courses for any one of these occupations, it should be done. Out of the 4,000 girls considered in this discussion, approximately 3,500 are estimated to be taking Homemaking courses and 500 to be in the Trade Extension Courses.

Boys Working on Labor Permits.

What shall we do with the boys under 16 who enroll in the Continuation School? Take 4,000 of these boys in Wisconsin, for consideration. Their average age is 15 years. They are in very good health, have been quite regular at school before beginning their first employment, earn on an average a little more than $4 per week, and many walk or ride long distances to work. They are employed in making shoes, as messengers and delivery boys, office and errand boys, time keepers, helpers, sorting and assembling, packing and wrapping, folding and filing, tending and such generally simple tasks. The educational value of their work is very little, if any at all. They shift often from one job to another job, and quite as often from one occupation to another occupation. The labor permit brings these boys within the open door of the Continuation School and we are face to face with placing them either in the General Improvement Course, or the Trade Extension Course, or the Trade Preparatory Course.

Not In Recognized Profitable Employment.

It must be said that these boys in general are not in a recognized profitable employment, that they have not already determined their aim to remain in and become efficient in any employment, and that therefore, general improvement instruction may not wholly miss the mark in serving the group as a whole. However true, in a general way, this conclusion may be, there remains the fact that it is pre-eminently the responsibility of the Continuation School to train and guide these young workers into a recognized employment wherein they may become self-supporting citizens. Measured with the standards of the established schools, they are about as well educated as the 4,000 girls mentioned in this paper. The girls, outside of home-making, have at least seven constant occupations for which they may be safely trained, viz., servants, dressmakers, teachers, saleswomen, laundresses, nurses, housekeepers, while with the boys there are twenty or more constant occupations for which they may be safely trained, viz., laborers, retail merchants, clerks, draymen, salesmen, carpenters, steam railroad men, machinists, painters, bookkeepers, waiters, engineers, printers, blacksmiths, masons, barbers, plumbers, street railroad men, shoemakers, bakers. The list might be extended but this survey of the present work of these boys and their future prospects is about sufficient for the needs of this moment.

The Present and the Future.

Only a limited number of these boys are now employed in the occupations in which they will be engaged in the future. Hence, Continuation Trade Extension Day Courses are possible only with a very few of them, possibly 400 or 500 of the 4,000.

Only a limited number of these boys, who are lacking a general education, will be greatly helped by General Improvement Academic Courses possibly only another 400 of the 4,000 under consideration.

The dominant service seems, therefore, to rest thru the activity of the Trade Preparatory Courses, which provide a form of instruction given in a trade or occupation, not followed by its pupils during the balance of the working day. Take the boy who is packing now, thru the Trade Preparatory Course and make him a thoro-going carpenter; the boy running errands now, thru the Trade Preparatory Course becomes a salesman or clerk. Obviously, the Trade Preparatory Course, expensive tho it may be, takes the boys drifting today, as they are, at least 3,000 strong, toward the constant occupations that they will find waiting for them tomorrow.

Trade Preparatory School.

The question is, in the last analysis, how to pick out the boy or girl and fit him or her to a life-long job. This fitting must be done by guidance and training. The part-time day training takes place in a Continuation School. Such a school, in view of the needs of those who attend it, may be a General Improvement School. It may be a Vocational Trade Extension School. However, the great demand is for it to be neither the one nor the other. On the contrary, the conclusion is that the School that serves the largest number in a practical manner is the Trade Preparatory School.

Industrial, Commercial and Evening Schools.

This paper is confined to the treatment of the Continuation School, the persons eligible for admission to it, and its courses of instruction. It is only one of the four kinds of schools that come under the new Industrial laws of Wisconsin. The other three are:

1. The Industrial Day School.
2. The Commercial Day School.
3. The Evening Classes.

Some people have been led to think that Wisconsin rested its industrial training under its new laws solely on the Continuation Schools. That is an error that should be corrected here.

The Industrial School.

The Industrial School is a day school that provides trade education, the purpose of which is to fit for some one of the numerous trades or subdivided industrial employments. It is not a part-time Continuation School.

Because of the extensive sub-division and specialization of industrial pursuits, the number of different occupations for which industrial education can be devised seems to be almost without limit. The following are

some of the trades for which, in greater or less degree, industrial training is now available in some communities: machinist, house carpenter, patternmaker, cabinetmaker, plumber, steamfitter, moulder, weaver, electrical worker (in various forms), baker, butcher, printer, bookbinder, dressmaker, milliner, power operator, cook. A large number of other trades offer opportunities for special vocational training, such as those of teamster, motorman, locomotive engineer, lithographer, bricklayer, lather, patternmaker, and the like.

The Industrial School is a vocational day school offering in general the following special characteristics:

a. Admission requirements based upon those required for a working permit, usually 14 years of age.

b. Often offers less than a four-year course.

c. Does not in general plan to give the full equivalent of an apprentice training.

d. Is especially planned to deal with pupils from 14 to 16 who have determined their aim, tho it may deal with pupils much older.

e. Often offering trade extension courses as an organic part of the work of the school.

f. Often shows more school organization and less industrial organization than a trade school.

Commercial School.

The Commercial School is a day school that trains for wage earning. It trains for efficiency in commercial employment. It is given to pupils who have determined their aim in this respect, and under conditions which aim to duplicate real business conditions usually in some one field.

Commercial education for vocational purposes includes those forms of education the controlling purposes of which are to fit for some recognized commercial calling.

Of the commercial vocations, accountancy or bookkeeping and stenography are at the present time most clearly defined for purposes of vocational training. Salesmanship is being recognized also as a differentiated field admitting of systematic training. There are two distinct forms of salesmanship, i.e., counter, or indoor salesmanship, and field, or traveling salesmanship. For each of these, some systematic training is now possible. Other callings of a clerical nature are gradually differentiating so as to suggest appropriate forms of vocational education. Other examples of specialized commercial education are: Secretarial work, Office work, Cataloging work, Library work, Advertising, etc.

Evening Schools.

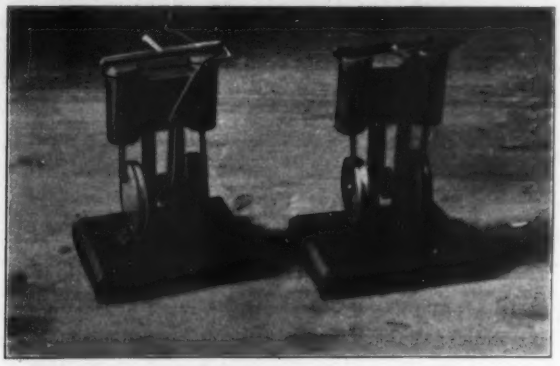
The evening schools are open to all persons over 16 years of age in trade extension, trade preparatory, and general improvement, courses. The maximum state aid on any one school for any one year in any city is $3,000, provided that no more than $10,000 aid be granted to any city in any one year. It is clear, therefore, that the Continuation School represents only one of the four industrial and commercial activities in the state.

Vocational Preparation.

One thought more, in conclusion. The May, 1914, number of the Educational Review says that "The basis for any true vocational preparation is training to know a few things well and thoroly, and in gaining such knowledge to form those habits of mind and of will that fit the individual to new duties and unforeseen emergencies." It is well, amidst all this machinery that seeks to train young people for efficiency, to cling to a few fundamental principles, like this one, and not lose our bearings completely.

THE WELL-SELECTED MODEL

That is a proper project for a pupil to make, which—while it takes his ingenuity and ability—if he tries his best, he can make WELL and ENTIRELY by himself.—*Milton Clauser.*



Front and Rear Views of Two Cylinder Engine.

ELEMENTARY MECHANISMS

Ray F. Kuns, Cincinnati, O.

(Fourth Article)

Two-cylinder Upright Steam Engine.

Base. Work this out to size, using any good sound wood. If a nice piece of cast iron is available, it might be used in preference to the wood, thus giving an all-metal engine.

Eccentric Mold. This is easily made, yet care must be used to get all measurements correct. The block may be of pine, poplar, mahogany, or any other fine-grained wood available. In the center of the block bore a 1¼″ hole until the spur of the extension bit has cut just ¼″ deep. After removing bit, plug up the hole made by the spur of the bit, and smooth up the bottom to the proper depth. Next measure off a point 3-16″ from the center of the mold. Placing the spur of the 5-16″ bit on this point, bore a hole on thru the block. Bore another 5-16″ hole at a point on the opposite side of the mold to be used merely for pouring the casting.

Wheel Mold. This may be worked out with the extension bit, or if a lathe is available, on it. A 5-16″ hole is bored in its exact center. A larger hole is bored to one side of the center to provide a place for pouring.

Soldering Jig. This is for holding the cylinders in line while soldering them together. Any soft wood will serve well for this. All parts are fastened onto the bottom board excepting the two-inch piece in the center. If a good jig is secured, little trouble will be experienced in doing the soldering later on.

Wood Block. This is used for fastening the ends of the two parts of the frame together. Much depends on its being true and to size. The holes are ⅛″, but should not be bored until the frame is ready to assemble.

Frame. Two pieces of ⅛″x⅞″ iron are required for this. Work these out according to the drawing. The side of the center hole, which is for the bearings, is not shown. Sometimes this is drilled the exact size of the shaft, that is 5-16″. However, if a really good bearing is desired, the hole is first drilled with the 7-16″ bit, and bushed with a short piece of brass tubing (⅜″ long) having an inside diameter of 5-16″. While this is not at all essential to the running of the engine, it does add to its appearance and durability.

If these bushings are used, they are first worked out to size and placed in position in the frame which is assembled on the base. With the shaft in position, the bushings may be securely soldered to the frame. This method of handling insures greater success in lining the bearings and preventing their binding. In case they should bind, however, the fault may be remedied by running the 5-16″ drill bit thru them, while in position.

Shaft. This is made from round brass rod. After it has been cut to length, and the threads have been cut on the ends, the file is used to cut a flat place for the keys which are used to prevent the wheels from turning on the shaft. Be very careful not to mar the shaft in any way while holding in the vise to cut the threads. Hardwood blocks may be used between it and the jaws of the vise.

Wheels. First clamp the mold, previously made, fasten on the band-saw table, bench top or any other true surface free of all varnish or stains, using a C clamp and having a piece of paper or cardboard under it. Place the shaft in the center of the mold, carefully squaring it up. To do this, place the try square to one side of the mold, having the handle of it resting evenly on the table top and the blade standing vertical. Sight over the edge of the blade past the edge of the shaft. If the two line, the shaft is square with the face of the mold from that side. Next, move the square one-quarter of the way round, and test again. When square from this point, move back to the first point, testing again from it. When found to be true, fasten shaft in place, and pour full of melted metal. Use lead or babbitt metal. Do not make the mistake of placing the open side of the mold up, but keep this down against the paper and in pouring, use the hole bored for that purpose.

Do not heat the metal much above the melting point. After pouring allow five minutes to cool, when casting may be removed from the mold and the shaft turned out of it. If a little chalk dust has been placed on the threads before the casting is poured, trouble will be avoided in removing shaft. In a similar manner, work out the other wheel, after which the lug left by the

hole for pouring may be removed from the wheels and the castings otherwise smoothed up. A mold of this nature usually gives better castings after it has been used a few times, and if handled properly, will give quite a number of them.

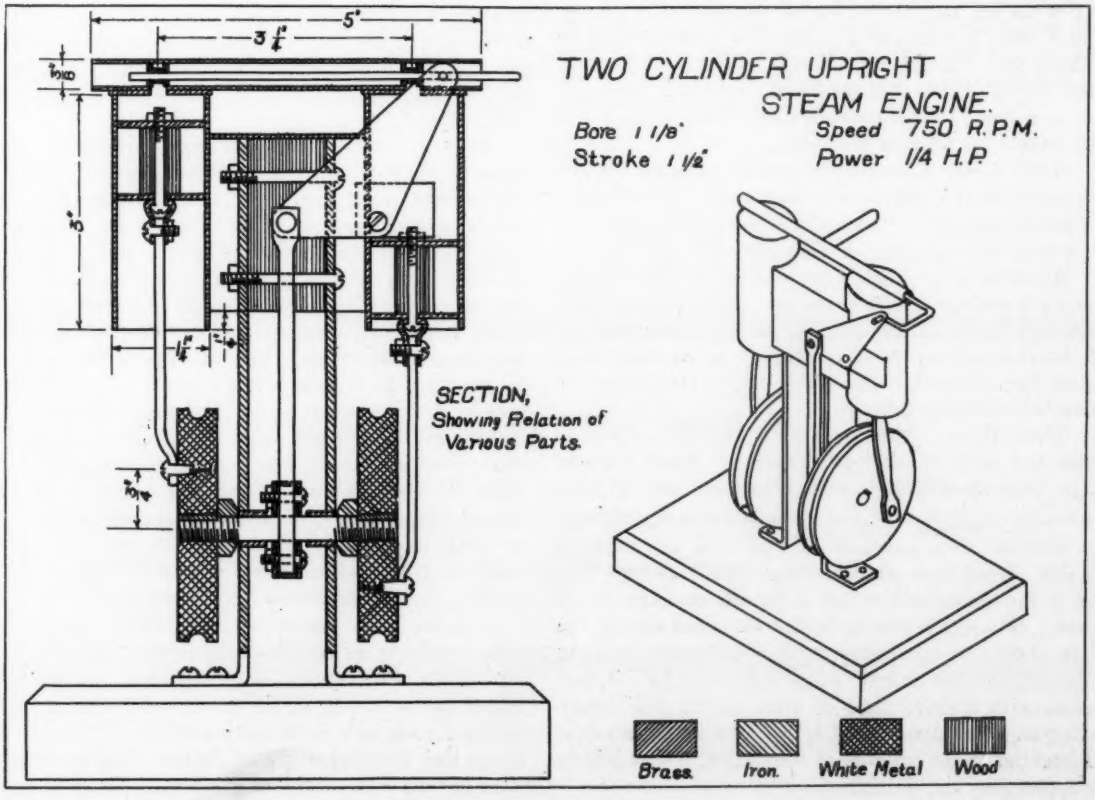
Eccentric Ring. Inasmuch as this is used in casting the eccentric wheel, it must be worked out previous to that operation. The ring is a piece of the tubing which is used for the cylinders. This tubing is 16 gauge 1¼". After the end of the tube stock has been squared up, the ring is laid off with the marking gauge to the width of ¼". Next saw just beyond the line, and then cut just to it with the file. This saves material as well as making the work easier. Be sure to use the V-shaped blocks in holding the tubing.

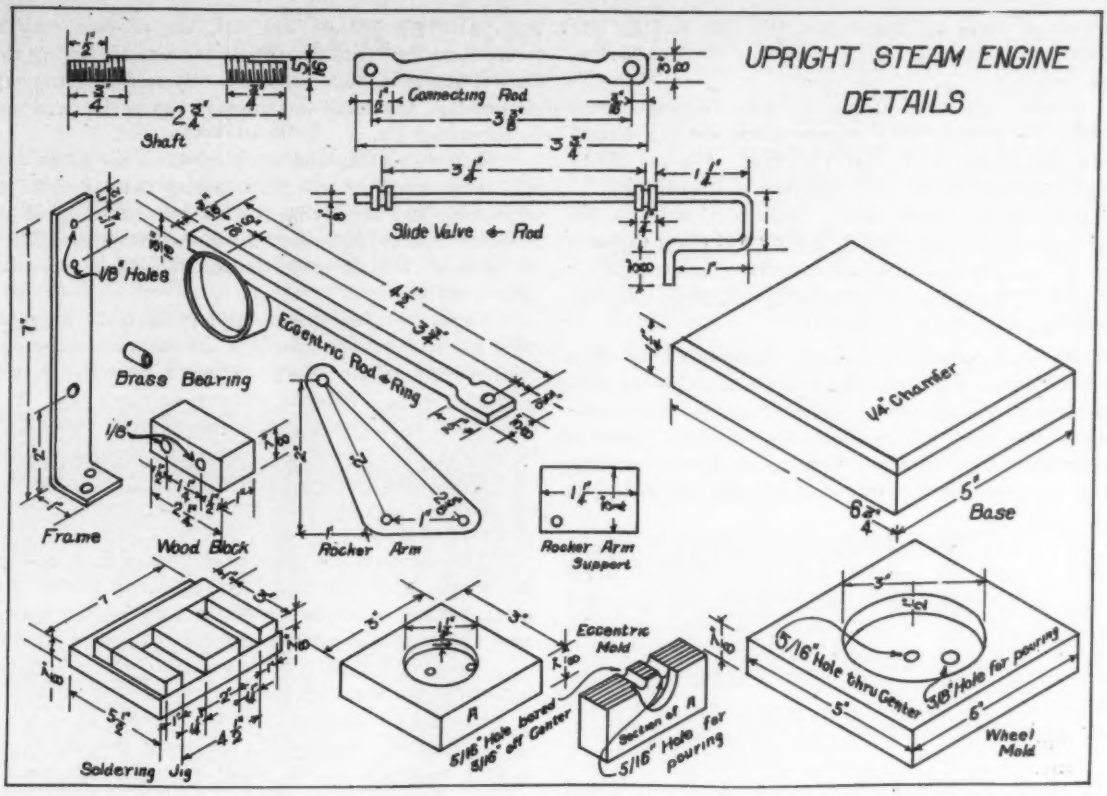
Eccentric. Place ring just described inside the mold previously made, and clamp in position, open face down on the paper. Next line up a piece of 5-16" rod in it by the method described above, after which the mold may be run. When casting has been worked up, it should measure just a trifle thicker than the ring is wide. This is to prevent the washers which hold the ring on the eccentric from binding it and causing it to turn hard. These washers are of sheet metal and are 1¼" in diameter with the hole the size of the shaft bored 3-16" off center. They are held in place on the wheel by means of two ⅛"x½" R. H. stove bolts.

Eccentric Rod. This is made from brass or iron stock 3-16" square. The one end is worked out flat and has a ⅛" hole drilled in it for fastening the rocker arm to. The other end is rounded out at the point indicated to take the ring. These parts are held together with solder. In doing work of this nature, it is always well to tin both the parts before placing them together. Place them together, solder the edges, and then hold in the blaze until the heat thus applied causes the solder to melt and run. This insures a good strong joint.

Assembling These Parts. First place the eccentric on the shaft at its exact center. With the 3-32" bit drill a hole from the narrow side of the wheel all the way down thru it and the shaft. Place an iron pin in this to hold the two together. Do not allow the ends of this pin to be quite long enough to strike the ring, when it is placed in position. Next bolt the washers to the wheel, having the eccentric ring in position.

Place shaft in position and fasten frame together at top and onto base. Turn a 5-16" nut onto each end of the shaft. These nuts must not measure more than ¼" in thickness. Next cut a slot in each wheel for the keys, run a wheel on each end of the shaft, and key them in place. Turn the nuts tight against the wheels. The ⅛" holes for the screws which are used for fastening the connecting rod to the fly wheels, may now be located and drilled. In determining the points for these, turn the shaft until the eccentric stands with the full side to the front of the engine. This position is easily found by allowing the eccentric rod to lie horizontal instead of standing vertical, and turning the shaft until the end of the rod stands as far out as it will come. While held in this position, lay off a vertical line thru the





center of each wheel. On these lines centerpunch the points for drilling the holes, placing one at the top of one wheel and the other at the bottom of the other. Get these as shown in the drawing, or the engine will run backwards.

Connecting Rods. Work these out as shown in the plate of details. The lower end is bent as shown in the section to give clearance for the wheel.

Steam Chest. Use seamless drawn brass tubing for this—20 gauge is about right. A piece of the same tubing about 1½" long is used as a connection, and is soldered to the steam chest at a central point. A 3-16" hole is drilled into the steam chest at this point and the short piece of pipe rounded out to fit the longer one and soldered fast, keeping a wood plug in the hole in the steam chest to prevent the solder filling it up.

After soldering together, lay on the bench with both pipes resting on it, and lay off for two more holes of the same size. These are for the ports, and must be exactly 3¼" apart as well as equidistant from the ends. Centerpunch and bore these. With a fine half-round file, carefully remove all burrs from the inside of the steam chest. These will be found in the end, and where the drill bit cuts thru. Work very carefully at this, so as not to scratch the inside of the tubing more than is necessary.

Slide Valve. First bore a 5-16" hole, ¼" deep, in a block of wood. In the center of this bore a ⅛" hole on thru the block. Take a piece of ⅛" wire a little longer than needed, and insert one end in the hole just bored. Melt solder into the larger hole, until it is well filled, working it thoroly with the soldering iron. The work is made easier and the completed job is stronger, if the point on the wire coming in the 5-16" hole is first carefully tinned. Having thus formed one of the slides, measure off for the other and as carefully form it. Remove from the block, and work slides into shape. The groove should be about ⅛" wide and cut almost to the wire, being sure to get the same depth all the way around. Next trim to a snug fit in the steam chest. The last process on this is the bending of the long end to the required shape.

Cylinders. Sixteen-gauge seamless drawn brass tubing is used for these. Work them out to the required size being certain the ends are square and removing all burrs from the ends. Cut two discs from 18 gauge sheet metal, and solder one of these over an end of each cylinder. Place the cylinders in the soldering jig. Solder a piece of the same weight material, 2¼"x2⅜" onto the cylinders, having the short side touching them and the edge just ¼" from the lower end of them. Turn cylinders over in the jig, laying the center block between them on top of the piece just soldered fast. Solder a similar piece of sheet metal on this side. Remove from the jig, and fit another piece of sheet metal over the top edges of the pieces just soldered on. When this has been soldered in place, the pistons may be worked out to fit the cylinders.

Pistons. Two of these are required of the shape shown in the section. Excepting for the size of the discs

or washers these are made just the same as the one shown in the drawing for the One-Way Horizontal Engine.

Rocker Arm and Support. Use 16-gauge sheet metal. The holes in each of these pieces are ⅛″, drilled with their centers 3-16″ from the edges. The end of the support must conform to the shape of the cylinder.

Assembling These Parts. Drill 3-16″ holes in the center of each cylinder head. Make wood plugs to reach thru these holes from the inside of the cylinders.

Place Steam Chest on cylinder, soldering fast; the plugs will keep the ports open.

Place in position on frame. Drill two holes thru the sheet metal plates and the wood block. Fasten with ⅛″ round head stove bolts. Place pistons and connecting rods together inserting in the cylinders. Fasten connecting rod to the wheels with ¾″ R. H. wood screws, being sure to have the hole in the connecting rods just the proper size.

Fasten rocker arm to the eccentric rod. To obtain the universal joint required here, place a R. H. stove bolt ⅛″x½″ thru the rocker arm, running on a nut until it comes within 1-16″ of it. Next place on the eccentric rod, and run a second nut tight against it. Fasten rocker arm on support using locked nuts on the back. Allow no play, yet be certain that the parts do not bind and work hard.

Insert slide valve, fastening in place with slides just covering ports as shown in section. A small wood wedge slipped in the steam chest aside of the valve rod will hold it.

With the connecting rod standing straight up and down, hook the rocker arm on the valve rod end, and thus find the correct location for the rocker-arm support. Having worked this out, the support may be soldered to the cylinder. Much depends on having this part of the work done correctly. By soldering the support on last, any small variations in any of the parts may be accounted for.

Remove pistons and slide valve. Pack these with well oiled waste or soft yarn, seeing that all sides fill out evenly and are springy or spongy. The higher the pressure expected to be used the more firmly these should be packed. Oil all parts, testing for either too much play or friction.

Testing. Connect the engine to the boiler by means of a piece of rubber tube. If all parts are in proper relation, the engine should run on a pressure of from 5 to 10 pounds. Later it will run on much less. If it should fail to run on such a pressure, the trouble should be sought and remedied at once. If the engine runs, but runs jerky and unevenly, the trouble is usually excessive friction at some point, or it may be poor adjustment of the slide valve.

The engine is now finished excepting the grooves in the wheels and painting wood and iron parts. Any paint, enamel or bronze which suits the builder may be used. Brass should never be painted but always polished.

Grooving Wheels. While a lathe, if one is available, is perhaps the best and quickest way of doing this, it is by no means an unusual thing to cut them in by means of the engine's own power. In doing this the engine is first connected to the boiler having a fair head of steam. A round-nosed chisel is held on a rest, so that the face of the wheel will strike it as it revolves. If the engine is pulling as it should, it will be only a matter of a little time until the grooves are finished.

Keep all moving parts well oiled and all nuts and screws tight.

IT IS STRANGE that so few schools in the State have considered printing as a desirable form of industrial arts work. It is an effective way of teaching spelling, punctuation, and composition. It makes possible the application of border lines, lettering and spacing, which is emphasized in drawing courses. It develops neatness, orderly arrangement, taste and appreciation of color.—*Andrew S. Draper, Former State Commissioner of Education, New York.*

ART SMITHING

Thomas Googerty, Pontiac, Ill.

(Second Article)

Exercise No. 2.

Twisting. A piece of one-half inch square stock, nine inches long is heated its entire length, one end caught in a vise and with a monkey wrench or heavy pair of tongs on the other, it is twisted to the right. If the heat is an even one and not too hot, the spacing of twist will be uniform. In case one part twists faster than another, a little water is used to cool that part. The beauty of twisted work depends on having the spacing uniform between the turns. (See Figure 14.)

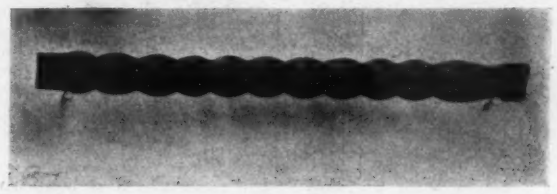


Fig. 14.

Flat stock can also be twisted in this manner. To straighten twisted work, it is heated red, set on the end grain of elm wood and hammered with a wooden mallet. The mallet used in this work should be made from hickory. For heavy striking a little band of iron can be put on the mallet a half-inch from one end, so that the mallet will not split. The block on which to straighten the iron should be about ten inches in diameter and three feet high. A short block about eight inches in diameter and twelve inches long may be set into the coal box, having coal under and around it to hold it in place. This makes a very handy block on which to bump up light pieces of metal or to straighten metal upon.

Exercise No. 3.

Figure 15 shows the dimensions of stock for a twisted poker-handle. The 4¼-inch rods are upset on

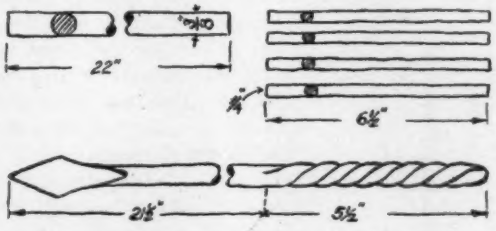


Fig. 15.

one end until they measure six inches. They are then welded together on this end. This is done by first twisting a strong binding wire around the rods to keep them in place while taking the heat. (See Fig. 16.) In welding, they are welded directly on the ends and scarfed as shown in Fig. 15.

Notice that the scarf is made so that the point of the scarf on the other piece will come onto a one-quarter inch rod and not between the two. The scarf must not be hammered farther back from the ends than

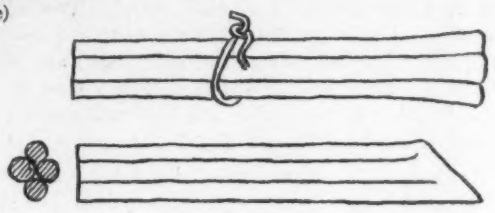



Fig. 16.

⅜-inch. The ⅜-inch bar is now upset on one end and scarfed. The two parts are then welded, smoothing the weld with the hand hammer. The end of the handle is welded directly at the ends of the rods. The entire handle is heated uniformly; caught in a vise and twisted to the right. If any part twists faster than another,

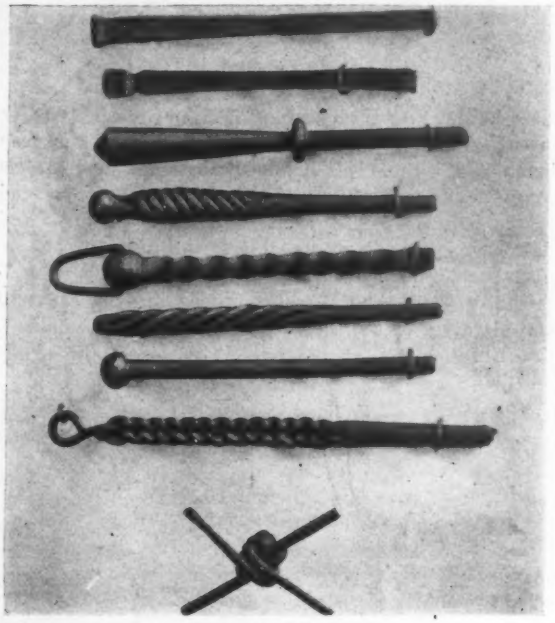


Fig. 17. Poker Handles.

that part is cooled with water dropped from a hole in the bottom of a tin cup. In twisting the handle, the ⅜ bar is caught in the vise. A strong pair of tongs are used on the end of the handle to twist it, or the end of the handle can be caught with a monkey wrench. The point of the poker is drawn to a square point and then flattened. In making pokers or shovels, the stock may be either round or square. In Fig. 17 is shown

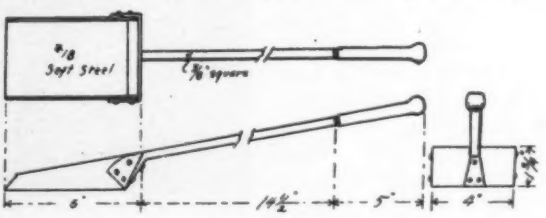


Fig. 18. Shovel.

some handles that are suitable for pokers or shovels. A method of braiding the last handle shown in the illustration is to weld 4 3/16 rods of either round or square stock to a piece of one-half inch round. Two of the rods are then bent over at right angles to the one-half inch piece. The others are bent over them, and so on until finished. The four rods are then welded at the top and a ring turned. The last illustration shows the method of bending the rods.

Exercise No. 4.

Shovel.—Fig. 18 shows the dimensions and form of the exercise. In making the handle, ⅜ square stock is used. The piece is cut 25 inches long. On one end the piece is upset considerably in order to get a good

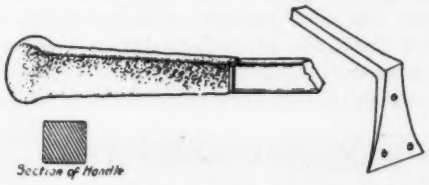


Fig. 19. Shovel Handle.

sized head. Five inches from the end of the head a line is cut on four sides with a chisel. This part is then hammered with a ball hammer while hot to give it a rough texture as shown in Fig. 19. The other end of the handle is upset a little; bent on an angle and flattened, letting it get as wide as it will.

The development of the pattern for the shovel blade is shown in Fig. 20. At the top is shown a side and end elevation of the shovel. The dimensions should be drawn full size. The shapes of the sides and of the ends are found by measuring from the elevation. The pattern should be made from sheet iron and kept for future use.

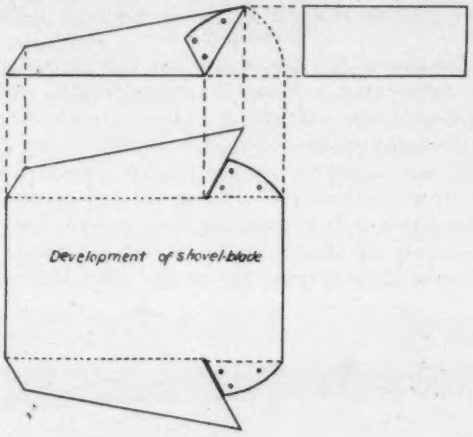
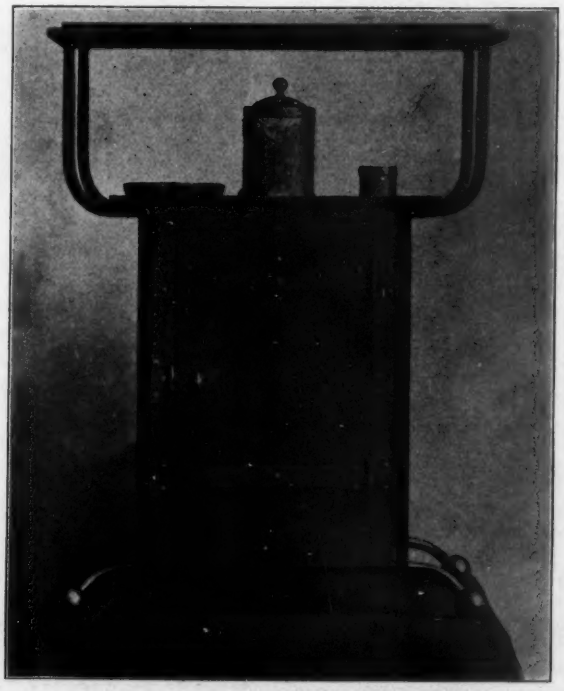
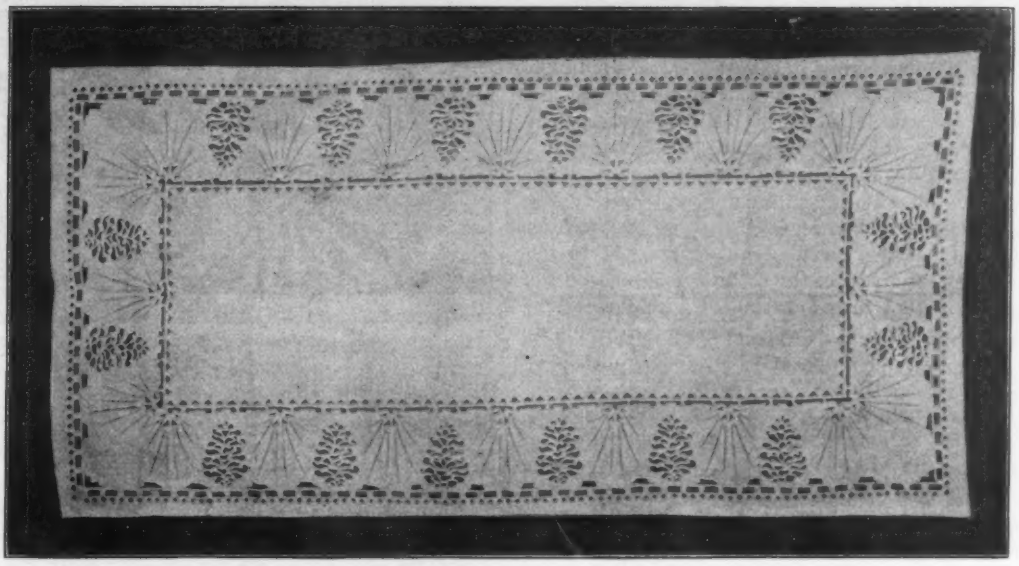


Fig. 20.

In forming the shovel, the sides are first bent up by using the vise and heel of the anvil. This forming must be done while the metal is cold. The end of the shovel may be bent by hammering it over a heavy, flat piece of iron. The corners are hammered around the sides by catching the shovel in the vise. They are fastened by drilling holes thru both pieces and riveting them, using a rivet set to finish the rivets. In fastening the handle to the blade or shovel, three Number 10 round-head rivets are used. If desired, the handle can be made from larger stock, also increasing the size and the thickness of the shovel.



SMOKERS SET IN IRON, COPPER, MARBLE AND WOOD.
Forged by Mr. Googerty.



A STENCILLED TABLE COVER, DESIGNED AND EXECUTED BY THE AUTHOR

CONCERNING STENCILLING

Mira Burr Edson Kohler, Washington's Crossing, N. J.

IT is not to be wondered at that stencilling is such a favorite form of handicraft, that it has been so universally popular, nor yet that it holds its interest long after the early and perhaps crude, efforts are made. It has been used in and out of season and sometimes not tastefully, but there are possibilities in its application to simple household needs that are irresistable.

Following the popular use of stencilling, many efforts have been made to improve or make easy the means, and dyes and stencil-knives and stencilboards, etc., have been put on the market. The process as here described is basic, however, and many beautiful patterns have been carried out under the writer's supervision by these means. When the student can work thus the general principles are well understood and after that any quick or easy short-cut may be employed that proves to be an advantage. Having the whole process in mind anyone can adapt materials, of whatever kind, to the nature of the work to be done and the effect that is desired.

The materials needed are:

(1) Manila paper.
(2) Bottle of sweet-oil.
(3) Transfer paper.
(4) Large piece blotting paper.
(5) Chalk or charcoal.
(6) Thumb-tacks.
(7) Drawing-board.
(8) Piece of glass.
(9) Ruler.
(10) Sharp-pointed knife.
(11) Turpentine.
(12) Bottle of shellac.
(13) Paints.
(14) Brushes.
(15) Palette knife.
(16) Saucer for mixing.
(17) Material to be stencilled.

Also, one or more soft rags and small pieces of blotting paper.

The pattern for a stencil must be wisely chosen. It requires both skill in design and some experince in making to produce a really good stencil pattern. It is possible now, however, to secure excellent ones for the purpose. In selecting for a beginner, it is best to procure one that can be applied in one color, or at the most, in two colors. This does not limit as much as may be supposed at first. The ornament should be well-spaced without fine lines or very large openings—the latter making the stencil weak.

For making the stencil itself there comes a stencilboard which may be preferred. This requires no oiling nor does it need the coat of shellac. It is very tough to cut, however, and this and some other advantages lie in favor of a heavy manila paper. Just how heavy depends upon a number of things. If it is to be used a great deal, or used by a beginner who may not be careful, a heavy grade is best, especially as it lies flat upon the material without special care. Ease in cutting is important, however, because it allows of a finer, fuller line than that made under high pressure. A person of experience can use a fairly light stencil and save time and effort in the cutting of it. For very delicate patterns it is best to use Whatman's smooth water-color paper. This is strong, light, easy to cut and keeps its form well.

For the cutting use a sharp, pointed knife and cut directly down and very firmly. Cut thru the paper each time, thus avoiding a ragged edge, and take a line that ends in a corner or at a convenient place for stopping, so that the new cut need not make a break with the old. There is a knife which comes for the cutting of stencils, but any with a sharp pointed blade which can be grasped firmly will answer.

Before cutting out, the pattern must be drawn or traced upon the manila paper. To do this, fasten the pattern down firmly upon it, with the transfer paper be-

tween, and trace, with care and a feeling for the drawing, the lines which make up the pattern. Do not let the vigor in the line be lost in the tracing, as often happens. A vital quality can be kept better by putting charcoal or soft pencil on the back of the pattern and so tracing thru. It will be smudgy, but the lines can be drawn newly by the aid of the impression and the smudge then dusted off. In tracing and cutting the pattern, enough should be repeated to allow of matching for a new lap of the stencil when applying it to the fabric. To repeat a part of the pattern is easier, and for other reasons better, than to make extra holes as markers by means of which to fit on the repeat; as the slightest deviation from these marks will seriously affect the pattern.

When the tracing, or redrawing, is done the paper should be oiled on both sides. A few minutes must be given for the oil to penetrate, and then any surplus should be wiped off. This seems to destroy the fibre of the paper making it easier to cut and less easy to tear.

Place the paper, with the drawing on it, upon a table or drawing board, and slip under it a piece of glass. Ordinary window glass will do, and it need not be the size of the pattern as it can be moved about as required. Pin the design down firmly with thumb tacks. Hold the knife at right angles to the paper and cut entirely thru with each stroke. Aim to cut each curve with one sweep by a slow but firm movement. When the conditions are right there will be a distinct pleasure in the actual work of cutting, making the corners and angles fall away clear and clean and the lines flow harmoniously. When the parts of the pattern are all cut out, the paper is taken from the board and given a coat of shellac on both sides. Shellac comes in bottles already dissolved at fifteen cents. Be sure to go over the edges of the openings well but do not allow the shellac to settle in the angles. This is now hung up to dry and when dry is ready for use.

Stencils can be applied to almost any material. It requires only a little adaptation of the usual method to suit any unusual requirements. The material used on fabrics may be oil color or dye. What material is used and what medium depends upon the article to be made or the use it is to be put to. Suppose the material is some simple fabric; crash, unbleached muslin or the like. Personally, I have found the oil-color most satisfactory, easily mixed and washing well. In this connection a word might be said: use luke-warm water and ivory soap, making the water soapy rather than rubbing the cake of soap too vigorously directly upon the pattern itself. When dry-cleaning is to be resorted to for cleansing, the dyes may serve better. The difficulty in using dyes has been in fixing them. This can be done by ironing the color when it is damp. Dyes put up for the purpose have directions with them. There are constantly put forward new materials and the best proof of the virtues of any is in a trial of it. Suppose that oil color is to be used. Place the material to be stencilled upon a large piece of blotting paper and over this the stencil, the whole firmly fastened down with thumb tacks to the table. Needless to say the material

A Stencil Unit, Designed by the Author.
(Note faint brush marks.)

should be quite free from wrinkles and not of the kind to "pull."

The color for the pattern will have been decided upon in the beginning and the necessary tubes provided. The color should be placed in a flat saucer, and, unless you are sure of getting the same tone of color again, it is well to mix enough for the whole piece in the beginning. In this case set aside all but a small portion which is for immediate use. If the mass must be kept over a day or two put water over it and it will keep soft. Upon the portion to be used at once pour a few drops of turpentine and mix well into the paint with a palette knife. The color must be made quite smooth and of the consistency of cream; continue to add turpentine until this is so. A thoro mixing is very important for many reasons which we need not take up here. In preparing the color do not make it all too even and dead in tone. If a blue-green, for example, let it be slightly bluer or slightly greener in places, hardly to be distinguished, only to relieve the flatness and monotony as if printed. Avoid, at all hazards, a flat, unvaried and lifeless spread of color as by a machine. To apply it take a flat bristle brush as large as convenient to the pattern. One about half an inch across is a good usual size. Have the dish of color in a convenient place and the bottle of turpentine within reach. Dip the brush, before beginning, into the turpentine and wipe it off. Dip into the color, taking only a little on the brush at a time. If too thin or not well mixed there is danger of "running." A "painty" effect is due to the same causes. A little practice will enable you to work freely and with confidence and to know how much color you can carry on the brush at once without danger to the result. One thing, if the color needs thinning, as it will frequently do, put a few drops of turpentine upon it as before and mix in, but do not be tempted to dip the brush directly into the turpentine. It should always be carefully mixed before reaching the goods. Hold the brush upright and brush gently from the edges of the openings toward the centre of each. This ensures a good line. One may purposely allow a variation in color by allowing one edge to be a little lighter than the other sometimes, as suggesting light upon it and avoiding monotony. Usually, however, there will be some variation due to the handwork which is enough to lend variety, and a beginner is apt to overdo it if striving directly for variety.

Some materials are much easier to use than others. Silk is one of the most difficult. Velvet is so easy it almost does itself, but should be lightly brushed over the surface, not thickly "painted." Inexpensive materials are best to begin with and generally the most appropriate for the uses intended. Linen crash is useful and easy to decorate and can be applied to a variety of uses, table runners and doilies, small table-covers, couch backs and other articles for the household. Unbleached muslin requires some care to work the color into the fabric well, and should be well covered as not particularly attractive in itself. Even corduroy, matting or carpet, as well as cheesecloth, linen or other lighter fabrics, can receive a stencil.

In selecting colors use quiet ones; the beginner always tends to use too strong contrasts. Variations of one color can be made very pleasing. In working out a pattern, should a mistake occur either in the repetition or in placing the color, do not think that the piece is necessarily spoiled. By a judicious readjustment the situation can usually be saved. If the spaces are kept about like those of the pattern even tho the exact form of the motif is interfered with, the general effect is so like that there will be few who know it. When discovered by a careful eye it has the charm of a kind of humor, of freedom kept within bounds. Examples of irregularity are to be seen in Eastern rugs where the small border patterns are almost never repeated with any mechanical regularity but vary constantly in either form or color, and yet are none the less harmonious and appropriate because of this human note which shows the constant presence of a guiding hand. A slight irregularity is better than a too monotonous or mechanical handling. Skill in this is a combination of natural taste and experience.

Remember that in stencilling there is no part which can be done thoughtlessly or carelessly without marring the result. Whether cutting out the stencil, planning spaces, redrawing the pattern, or applying the color and suiting it to the fabric—every part can be made to show that the careful hand of the artist was present. The offense in crude work is in the absence of this; when present, any attempt, even the most humble, can be interesting and pleasing.

The table runner and doilies shown are stencilled in browns upon an ecru linen, coarsely woven. There is a great deal of variety had in the treatment of the acorn, the pattern not being duplicated. Whether this is more desirable than a repetition of one arrangement depends upon the conditions of use.

Another illustration shows a tablecover for cottage in a pine cone pattern of green and brown, which has proven to be very pleasing. The background is a light grey crash.

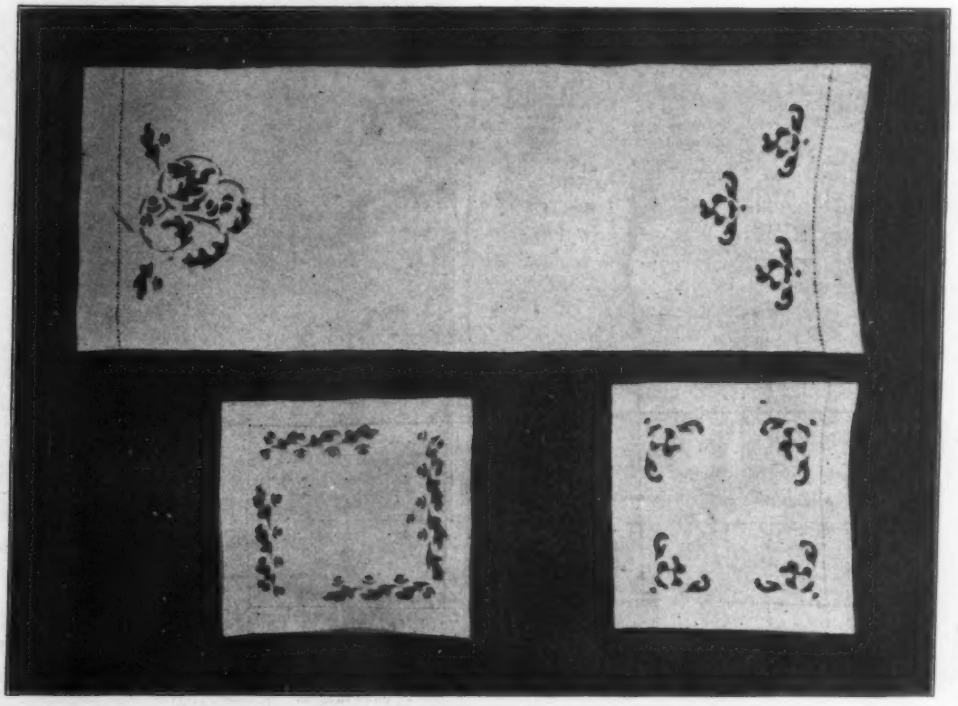


TABLE RUNNER AND DOILIES STENCILLED BY THE AUTHOR.

PROBLEMS IN DESIGN

Bonnie E. Snow, Millburn, New Jersey

(Lesson VIII)

THE PRINCIPLE OF BALANCE. In the previous lessons of this series we have shown that rhythm is a fundamental principle of arrangement, and that observance of this principle demands that there shall be relationship between background and unit, as well as between all parts of the repeated units themselves, when used in borders, in surface repeats or in compositions of any kind. In almost every example which we have used to illustrate rhythm, however, there has been essentially present another principle which we are now ready to consider. We cannot repeat a line or shape in any orderly system without making use to some extent of the principle of balance. Every design is made up of certain elements or parts, each one of which exercises upon the eye a certain attractive force. The equalization of these attractive forces is what is known as balance. Balance is that principle of arrangement which gives the feeling of rest. If in a room interior there is one piece of furniture that is too big, too bright in color, or eccentric in shape, the balance of the room is destroyed. We are conscious of the disturbing member whenever we enter the room. It compels our attention and becomes a source of irritation. A too violent color disturbs the balance of a costume. One instrument that is played too loudly disturbs the balance of an orchestration. So it is with design. One element may be too big, or too bright, or too aggressive, or it may be badly placed, or possess some other disturbing quality, and thus may destroy balance. We find, in any work of art, attractions of shape, attractions of color, attractions of movement, attractions of interest, attractions of technique. If any one of these forces is unduly emphasized, an effect of equilibrium or balance is not attained.

SYMMERTY THE SIMPLEST FORM OF BALANCE. When a line divides a space into two areas that are exactly alike in shape, size and tone, as in Fig. 1, an elementary form of perfect balance is seen. If into one of these areas is introduced a line, a spot or any element whatever, balance is immediately destroyed. The element introduced has a certain compelling force that draws the eye directly to that spot (Fig. 2). The introduction into the vacant space of an element exactly alike in shape, size and tone, and placed at an equal distance from the center line or axis, immediately restores balance (Fig. 3). The eye is now held equally by each spot, and a feeling of adjustment and rest results.

Fig. 1.
Diagram to show Areas in Perfect Balance

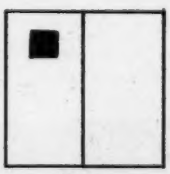


Fig. 2.
Diagram showing Disturbance of Balance.

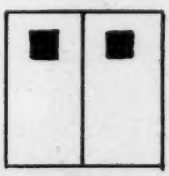


Fig. 3.
Diagram showing Balance Restored.

In all bi-symmetric or two-sided arrangements balance is the controlling principle. While sometimes lacking in variety, bi-symmetric designs are nearly always simple and dignified. Fig. 4 is a museum example of great beauty. It shows a piece of Coptic embroidery worked on linen cloth in dark brown. The contour of the unit is a simple leaf shape. The graceful curves within the contour are fine in movement and are in rhythmic relationship with the enclosing form. The small shapes employed to fill the field are again in good relationship to the contour and to each other. They form a delicate tracery and pattern, and are so treated that a delightful sparkle of light and dark is one of the chief charms of the design. This play of light and dark is the result of a fine balance between unit and background. That the design is symmetrically balanced upon the vertical axis is evident.

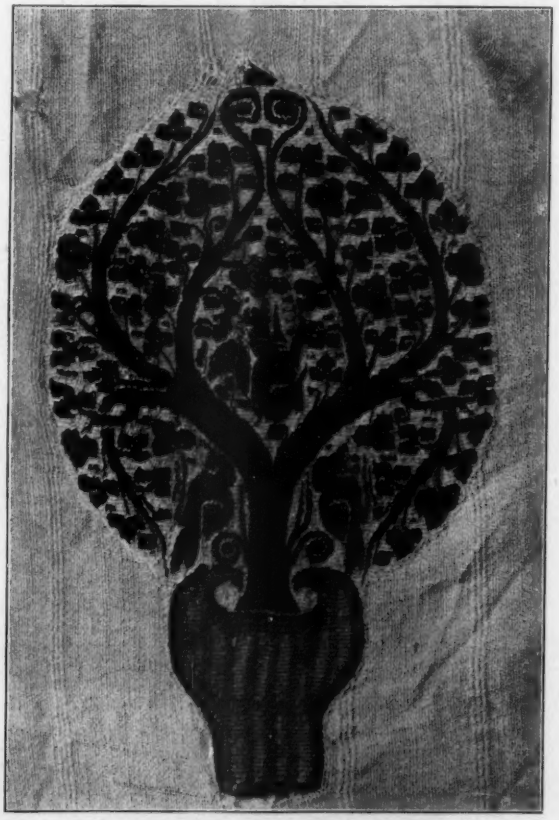


Fig. 4. Coptic Embroidery showing Bi-Symmetric Balance.

Another example of bi-symmetric balance is seen in the carved chair-back shown in Fig. 5. This is another treasure for the museum, and dates from medieval times. Here again rhythm is manifested in the treatment of a great variety of shapes. We see the suggestion of a human face, but eyes, nose and mouth are subjected to

the same treatment as tho they were abstract shapes; that is, the effort has not been to carve a likeness of a human face, but to use the motif suggested by the face as material for the rhythmic arrangement seen in the result. Perfect balance is here attained by repeating all lines and shapes in reversed positions on either side of an axis.

The beautiful cabinet shown in Fig. 6 was made in the sixteenth century, and like so many relics of that period is a fine example of well balanced proportions and ornament. It is perfectly symmetrical, its ornament is both structural and rhythmic, and no one element or part overshadows the evident purposes of use and service for which the cabinet was constructed.

In architecture the observance of symmetric balance is almost sure to result in an effect of dignity and

Fig. 6. A Serviceable and Beautiful Cabinet, showing Balance and Rhythm in Construction and Ornament.

Fig. 5. A Carved Chair Back, Showing Bi-Symmetric and Rhythmic Ornament.

strength. Look at the fine facade of the Colonial house shown in Fig. 7. In the arrangement of windows and doors nothing could be simpler. The fine proportions of these openings, the refinement of the ornament, and the general atmosphere of quality and "class" are obtained very largely thru the simple process of balancing one space against another, on either side of a vertical axis.

In the Metropolitan Museum in New York there is exhibted in carved wood a beautiful Swiss room (Fig. 8). The recessed windows are balanced upon a vertical axis, and so are the other constructive and decorative features employed. Observe the wooden figures placed between the horizontal panels of carving, forming the

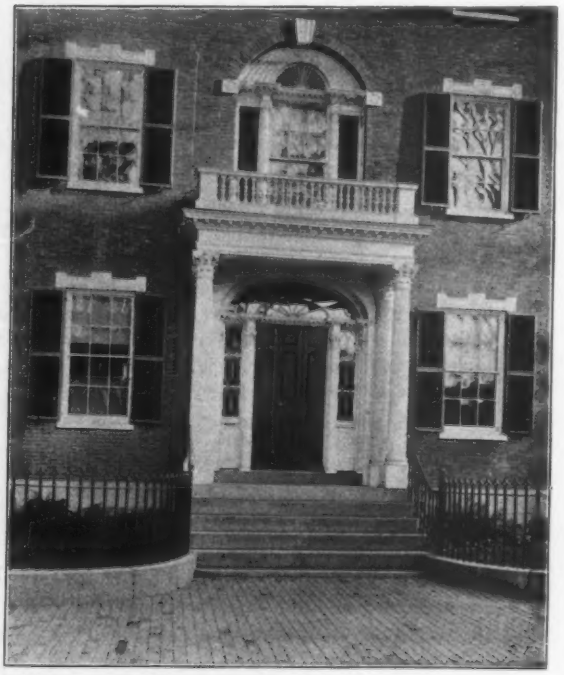


Fig. 7. A Colonial Facade showing Balance as a Fundamental Principle.

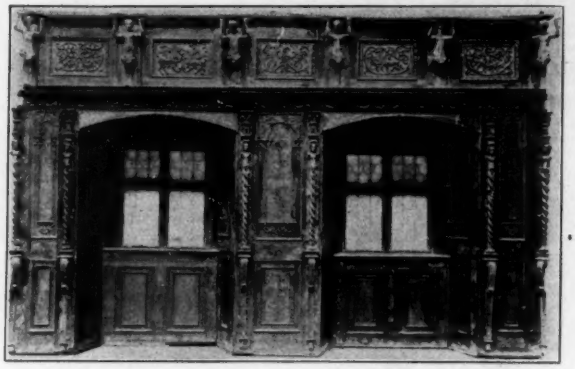


Fig. 8. A Room Interior Reproduced from the Original in Switzerland. An Illustration of Beautiful Proportion and Balance.

elaborate frieze used above the windows. Both figures and panels are bi-symmetric and are in keeping with the general plan of the windows, and with the constructive idea of the room as a whole.

Let us work out a practical problem, taking for our guidance the principle of bi-symmetric balance.

PROBLEM: TO PLAN A BI-SYMMETRIC UNIT AND TO ADAPT IT TO A BALANCED DESIGN. In planning a unit we must start with an idea of some kind. This may be based upon nature, upon geometry, or upon pure abstraction. It is best for the beginner to start with some familiar element, and to proceed along the line of least resistance. Let us take the shape of the pear as

Fig. 9. A Naturalistic Outline of the Pear.

Fig. 10. The Naturalistic outline Made Decorative.

Fig. 11. Further Enrichment of the Outline.

a starter, and see what we can develop. Beginning with a carefully drawn outline, studied from the fruit itself (Fig. 9) our second step is to throw this realistic drawing into the realm of design. This we do by simply increasing the width of the outline until it becomes a band (Fig. 10). Note the magical effect of this band; that which a moment ago was realism is now pure design. The addition of a thinner band or line gives to Fig. 11 a variety and enrichment which Fig. 10 does not possess. We now feel that it is necessary to add further interest to the field of the unit. This we might do in several ways: by adding the shapes of seeds, leaves, buds, petals, the calyx, etc. In this case we will choose seed elements; Fig. 12 is the result.

We have in this way developed a satisfactory unit of distinct decorative interest. We must now proceed to balance our unit upon a vertical axis. From former exercises we have learned that an easy mode of securing symmetry is thru paper cutting. Fig. 13 shows the process of cutting a unit from folded paper and Fig. 14 shows the result.

It is now necessary for us to decide upon the space in which our bi-symmetric unit is to be placed. Fig. 15

Fig. 12. The Field of the Unit Enriched by the Addition of a Seed Motif.

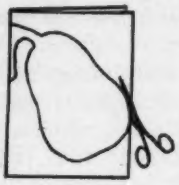


Fig. 13. Process of Cutting a Bi-Symmetric Unit from Folded Paper.

shows our selection. An oblong of fine proportions has been divided into rectangles of good relationship, with the thought of planning a design for a menu card. Our paper unit has been placed upon the vertical axis of the oblong, and its outline placed in the space allotted to it. Fig. 16 shows the addition of other elements, related in movement to the unit we have previously designed. The marginal bands have been filled in, and our design, already balanced as to its position, is now ready to be balanced in its light and dark quality. We first finish our bi-symmetric unit according to the suggestion of

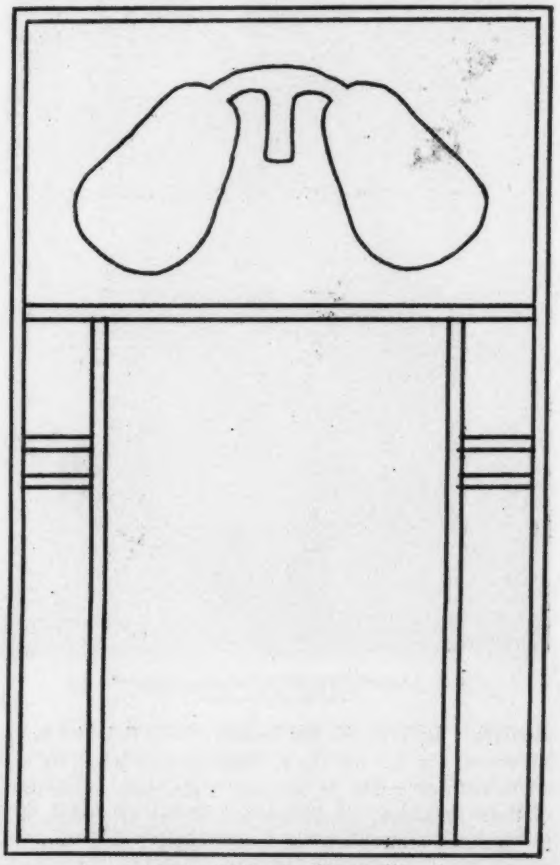


Fig. 15. An Idea for a Menu Card.

Fig. 12. This gives us the key note to the treatment of the other elements. The wide, dark band here serves a double purpose; it gives force and stability to the forms,

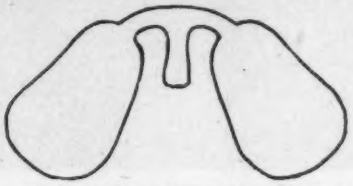


Fig. 14. The Bi-Symmetric Unit Unfolded.

and adds to our design a sufficient quantity of black, so that by this means we strike a balance of light and dark. In Fig. 16 we can readily see that our marginal bands overbalance our unit and its accessories. But in Fig. 17 the dark bands on all shapes together with the decorative network added as a part of the background bring about an interesting and satisfactory equalization of eye forces. This is what is meant by balance.

The addition of the word "menu" completes our problem.

The fact that our design as it now stands is well balanced in its light and dark combinations makes it possible for us to add strong color notes, if we choose to do so. Brilliant jewels of color may be placed in the small circular elements near the top. The pear shapes may be filled in with emerald green. The decorative elements in the small rectangles and the two rosettes at the top may be filled in with violet. The background between the pear shapes may be ultramarine.

This mode of designing and coloring is largely employed by workers in what is known as the "modernist" movement. It is in striking contrast to the subdued and grayed color schemes to which we have long been accustomed.

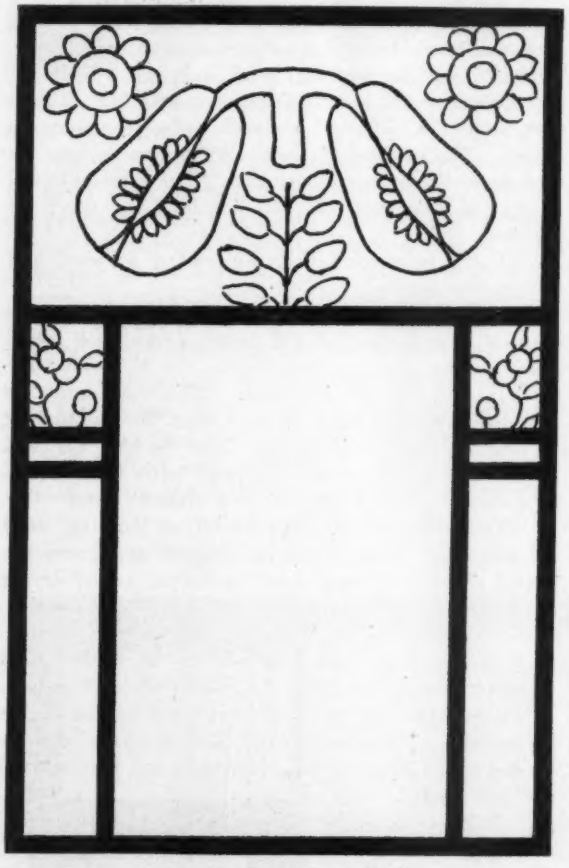


Fig. 16. The Development of the Idea.

Fig. 17. A Well Balanced Bi-Symmetric Design for a Menu Card.

RINGS DESIGNED AND MADE BY MR. SORENSEN.

A Ring with Applied Leaves and Flowers

H. R. Sorensen, Proprietor, Orno Shop, De Kalb, Ill.

WHY is it, that we use leaves, stems and flowers so much in applied designs? We think, of course, that they are beautiful, but that is not all.

This style of design is very effective when a high bezel is required, and the worker must reduce the high appearance as much as possible. The photograph at the heading shows this point clearly. The side view shows that the leaves have been so placed as to actually go up on the bezel and this helps to reduce the height of the bezel.

The Longer Ring Described in Detail.

A tracing of the original drawing should be on hand such as is shown at a. Fig. 1. The outline of this tracing should be transferred to eighteen gauge material. Now this can be sawed out and shaped around the ring mandril to whichever finger size is desired. It is then soldered at the connection of the two ends.

The next thing is to make the bezel; a double one is advised. The making of this was described in the April number of the INDUSTRIAL-ARTS MAGAZINE. The bezel should then be filed to fit the ring and made as low as possible, leaving, however, a complete ledge on which the stone may rest. Sometimes, when filing a bezel to fit a ring we file too much, thereby spoiling the inner bezel. This must be avoided.

When the bezel has been prepared for soldering, and fastened to the ring, with a fine piece of wire going over the bezel and around the ring (Fig. 1 C.), it should be held in soldering tweezers. By holding the ring in these tweezers the flame can be applied to the work at any angle by a slight change of the position of the hand.

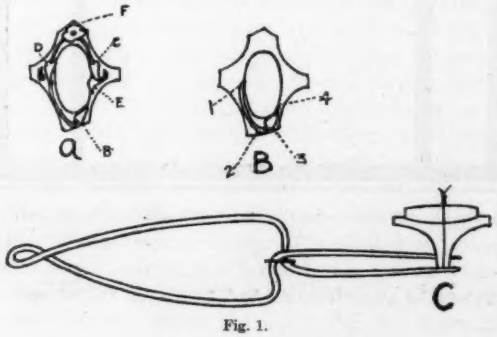


Fig. 1.

The ring should be cleaned well after each soldering. Now the leaf and stem at b, Fig. 1 A., should be cut out and shaped. Gauge 22 metal is used for leaves and flowers. The stem and leaf are of one piece. The stem is made long enough so that it will reach under the other leaf. The leaf form is now dapped, or bulged, on the reverse side until it receives a satisfactory shape. That is to say, the leaf may be dapped just a little bit, but then it might look stiff and not graceful. Therefore, shape the leaf until a graceful effect has been obtained. The shaping of leaves and flowers is done according to the taste of the maker. The main object is to get the decoration up on the bezel as much as possible.

It will be noticed that this leaf is soldered half way up the bezel.

After dapping the leaf its original shape has been changed, that is, the leaf will probably have been forced closer to the stem so that it does not fit around the bezel as the design indicates. This can easily be remedied. Simply use pliers and bend the leaf back to its original shape or better yet, bend the leaf and stem so that they will fit around the bezel better than the design shows. This, I find, can very often be done.

When the leaf has been placed on the ring ready for soldering, borax should be applied and the whole heated slightly. This is done for the purpose of drying the borax which then holds the applied piece in position.

Very small pieces of solder are placed at points 1, 2, 3, 4, Fig. 1 B. The ring should be held in the tweezers as shown at Fig. 1 C and soldered.

Remember that the ring part must be just as hot as the leaf. Therefore, do not blow the flame directly on the leaf. Heat the ring gradually and the leaf will get hot enough.

The next leaves, with stems, at C and D, Figure 1, are shaped in the same manner as the preceding leaf. The stems are left long enough so they will go under the flower. Leaf E can be put on next.

Now the flower can be made. The same gauge material is used for the flower. It is traced in the silver and cut out but not filed until later. Then with a small

ball punch, a depression is made in the center of the flower, for the purpose of receiving a little silver ball.

After the first impression is made the flower is reversed, and a depression is made on the back of each petal. The flower may then be finished, the edges being rounded a trifle with a fine needle file.

The little ball which is in the center of the flower is made as follows: Take a small piece of silver, about the size of the ball desired, and place it on the charcoal. A little borax solution should be applied; then it should be heated until it melts. The result will be a round ball.

To soldier the ball in the flower, place a small piece of solder in the depression intended for the ball and melt the solder.

After that the ball may be placed in the depression and the whole flower heated until the solder flows on the ball.

When placing the flower on the ring, one may find the stems too high. This can easily be remedied by filing the stem so that the flower rests satisfactorily.

Point F. should be soldered to the ring, and the points toward the bezel may be raised. The solder should be placed on point F. and where the flower touches the stems.

When all the soldering has been completed the piercing is performed. Then the outside edge of the ring may be finished with files and emery paper just as one would any other article.

PRINTING AS A VOCATIONAL STUDY

Hugh V. MacDonald, Boardman Apprentice Shops, New Haven, Conn.

EVERYBODY is familiar with the old saying, "The printing office is the poor man's university." There is a natural relationship between printing and almost all subjects of the school curriculum. There is no other line of school activity that is so peculiarly rich in its associations.

Printing invades and transforms other school topics by charging bookishness with reality. It brings the pupils in closer touch with the world of commerce; it gives familiarity with social, business and legal forms, it appeals to the boys who are inclined towards the commercial rather than the mechanical lines, where skill in tool processes is required. It teaches them to be extremely careful, observant, neat and persevering.

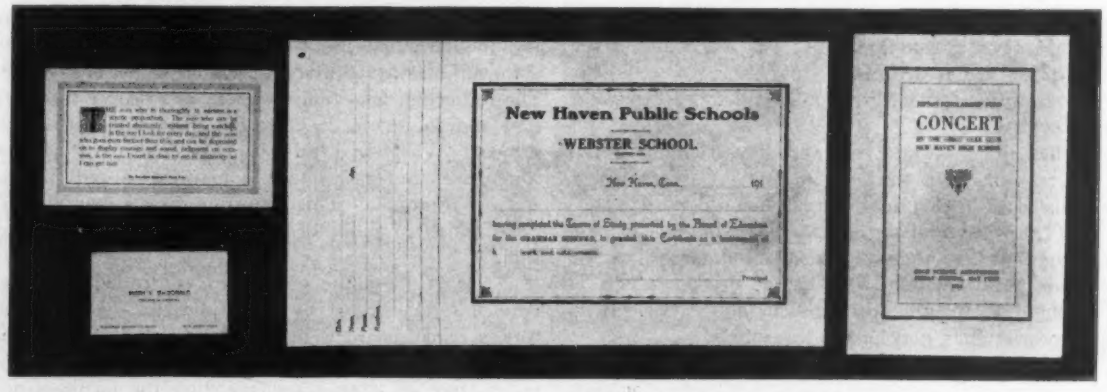
In my experience I have found that the habits of boys have become greatly improved by their connection with the print shop, and it has also given them a greater interest in their other studies. I could go on giving various reasons of this kind in answer to the numerous inquiries I have received, asking for information regarding the advisability of adding printing to the list of vocational studies, but the one I would bring to your notice most forcibly is *the productive value of printing.*

You can do your high-school printing and board of education works, and the amount of money you can save will be one of the greatest revelations you ever received during your observation of educational work.

In my connection with the New Haven High School I have been very much pleased with the work turned out by our students, and the wonderful interest shown.

The New Haven High School and Boardman Apprentice Shops are in the same building and the printing room of the Apprentice Shop is used by the High-School students to the entire satisfaction of all. The course for the trade school boys consists of two hours theory, or mathematics of printing, and six hours shop work, and runs fifty weeks a year. The High School boys have two periods a day, equal to one hour and twenty minutes, four days a week.

In conclusion I would say that I cannot endorse too strongly the advisability of superintendents recommending the installation of printing in their Vocational and High Schools.



SCHOOL PRINTING DONE IN THE BOARDMAN APPRENTICE SHOPS.

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

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EDITORIAL

CRITICISM OR FAULTFINDING?

In every field of industrial arts, great injury has always been done by too general and indefinite criticism. How many of us can recall experience in such work as design, for instance, when we were admonished to "do it over" or to "work on it some more," because the instructor "didn't like it," or "had a feeling that it wasn't good," or it was not "pleasing and subtle," or "it needed refinement?"

There is nothing more discouraging and more hopeless than to have such vague criticisms made of one's efforts without clear and explicit statements as to what the defects are and suggestions as to how such defects may be overcome.

Constructive criticism in any line, points out specifically and clearly the short-comings of certain efforts, and gives clear, definite, and helpful advice for their improvement. Without such suggestion and help, criticism fails to rise above mere fault-finding—always a curse in educational as well as other work.

The teacher who can lead a student to understand what his specific difficulty is and how he can best go about to correct it has not only won his confidence and respect, but has encouraged him and put him on the road to successful and happy achievement.

A DREAM MADE TRUE.

The contention between artistic expression and industrial efficiency is as old as humanity. It was first expressed in the difficulty which the primitive artist found in carving a stubborn material or in drawing a figure of which he did not realize the form.

But even with better tools and greater knowledge the restraint put upon the artist was not removed for artists must dream dreams.

Dreams rarely come true and still more rarely do they stay true.

When dreams come true and stay true they cease to be dreams. So the artist continues to dream just a little ahead of reality in this materialistic world.

Of recent years our artists have increased their knowledge of the market for their product and of the materials with which to supply that market. This is as it should be, for unrealized dreams do the world little good however they may please the artists.

The manufacturer has also of recent years learned a little of art. He has been forced to it by the demands of a more particular public.

In Germany the "Deutscher Werkbund" has become an Association that includes artists and the manufacturers of those products that require the co-operation of artists.

On creation of artistic interest that has resulted is model furniture that is known as "Typenmöbel." About eight hundred single parts of furniture have been designed in diverse proportions and forms but standardized so that they may be made by machinery. These parts admit of numerous combinations which result in a great variety of design.

It is reported that several prominent designers of interiors, in Germany, have been able to select from these forms and assemble designs that express their ideals of decorative furnishing.

May it not remain for this great mechanical age, with the aid of the artists, to devise mechanical means of creating in quantity the units of construction in such variety to allow of artistic expression thru selection and so in a measure bring the artist's dream true?

But we have noted that a dream come true is no longer a dream and that artists *must* dream.

EDUCATIONAL TERMINOLOGY.

There is a growing tendency to classify subjects of the school curriculum as either vocational or general, the basis of the differentiation being the *purpose* of the instruction. While it is perhaps possible to so classify subjects in our thinking, it is quite impossible to do so in practice. Almost every subject in the school curriculum may be, and is to a degree, vocational, while it also contributes to the general education of the individual. Baseball, in nearly all schools is practiced merely as a means of recreation, or for competitive athletics. "Scouts" from the major leagues visit high schools and colleges each year looking for material for "big league" players. The young men who are secured by these scouts, as a rule, have been playing baseball merely as a means of recreation, but incidentally they have developed a marketable skill or technique. Has this not been vocational training to them even tho their controlling purpose has not been to prepare for a recognized vocation? The study of locomotive engineering cannot be said to be vocational to a man who is color blind, because no matter how sincere his purpose may be, he can never acquire a marketable skill as a locomotive engineer.

The entire matter of terminology regarding vocational and industrial education will be very much simplified, if we will make our differentiation on the basis of *results*. The following definition seems to us to cover the situation and to furnish a basis for clear thinking on the subject: Vocational Education is any education thru which the student acquires a marketable skill, knowledge, or technique. This definition gives a tangible basis upon which to judge of a school or course of instruction.

Nearly all public schools are controlled, and their curricula determined by school boards. And, by the way, a school board is not always a board of education. It is a difficult matter to induce a school board to devote much time splitting hairs regarding the purposes of a school. They will judge of the school by its results.

Any subject of the curriculum is thus vocational insofar as it gives the student a marketable skill or knowledge. Manual Training, Industrial Arts, or Practical Arts, are vocational insofar as the student acquires thru them a marketable skill or technique. At the same time these subjects contribute to the general education of the individual. The difference is largely a matter of emphasis and of time devoted to the subject. The point to be emphasized, therefore, is the need of more time to be devoted to these subjects and the emphasis to be given to the vocational aspects of the subject.

The matter of terminology may seem to be of little consequence, but it has resulted in considerable confusion and trouble. Well meaning educators, representing powerful organizations have denounced "Manual Training" terming it a failure and a tragedy insofar as industrial efficiency is concerned. In various communities, schools, loosely termed "Manual Training Schools" which were doing work of a high grade, have, as a result, been subjected to the severest criticism and sometimes to reductions in appropriations. This year, school boards in several cities have refused to make any appropriations for "manual training" and the schools will thereby suffer immeasurably. These school boards have not made appropriation for "vocational schools" and in some instances have abolished schools of this character. Thus the *result* of the propaganda for industrial education has been the opposite of the *purpose* of the propagandists. It is altogether possible to promote vocational and industrial education without undoing whatever good work has been accomplished.

NEEDED RELIEF.

An acknowledged authority stated at the St. Paul meeting of the National Education Association, that 75 per cent of the school children in the United States, from 5 to 18 years of age, are physically defective. The overwhelming number of such defects are such as nasal obstructions, eye strain, and other conditions easily relieved by proper treatment and care.

The people of the United States have been generous with their funds for the erection of buildings—almost temples—for educational purposes, and for the purchase of splendid equipment, and this is as it should be. Is it possible that they are going to be slow in the matter of ministering in a medical and surgical way to the relief of these eighteen millions of children who are doomed, by obstacles which they alone cannot surmount, to a life at best much short of their possibilities under the conditions?

UTILIZING PRESENT FACILITIES.

During a somewhat heated discussion of Vocational Education in one of the department sessions of the National Education Association, a prominent superintendent of schools arose and spoke somewhat as follows:

"I am a superintendent of schools. I came to this meeting hoping to hear experts tell what should be done along this line. Instead, one expert has recommended one thing, another has said that that is all wrong, and he recommends another course. Now I must go back to my schools and do something and, if you experts do not know what to do, how shall I know what I should do in my schools?"

This superintendent touched upon one of the weakest points of the present movement of industrial education. In much of the planning present conditions have seemingly been disregarded and the fact has been overlooked that we already have a school system and that the only possible provision for industrial education, which may be made in many communities, must be in the present schools, with the present administrators, the present equipment and with the present teachers. The question is: What can be done under existing conditions? How may the present system be modified or enlarged to meet these new demands?

The Industrial-Arts Magazine is giving its readers accounts of projects which have actually been completed under present conditions. It is the purpose of the editors to have a minimum of theory and a maximum of practical material in the magazine.

SURVEY YOUR OWN WORK.

At this time when every subject and department of the school system is being closely scrutinized, analyzed and evaluated, it is a very wise plan to make a careful survey of your own work. It is not necessary that you publish the findings, but on the basis of them you should either modify your work, or be prepared to justify it in any and all situations.

Carefully estimate the cost per pupil for material, instruction, supervision, and overhead expenses in your department. Then conscientiously ask yourself: Is it worth it? You are taking the time of the pupil, and you are spending the money of the community. Are you actually giving your pupils the equivalent in skill, experience, knowledge or development, of the money and time which is expended in your department? Are you blindly following the course of models which was given in the school which you attended, or which you "cribbed" from some one else? Are you having boys, in whose homes there are plate rails, make plate racks? Are you having girls taught to iron with electric irons when in their homes they must use the common sad irons? Are you having the boys make towel rollers while the teacher of hygiene is teaching them not to use roller towels? Or, are you giving your pupils real instruction and experiences from which they will learn valuable lessons? Can you go before a group of hard-headed business men, tell them frankly the total per capita cost, and successfully justify the continuance of your department? If not, you are in a dangerous position for sooner or later you will be called to account.

As yet, we have been unable to grasp the significance of the term, "practical arts." Are there any arts which are not practical?

"Art is nature passed through the alembic of man."—Emerson.

"Art is the middle quantity between the thought and the thing."—Coleridge.

"Art is nature expressed through a personality."—William Morris.

"Art is everything which we distinguish from nature."—Andrew Lang.

HOW IT WAS DONE!

The purpose of this Department is to present monthly a wide variety of shop projects which have been actually worked out in elemenary, high, trade and continuation schools. Contributions are solicited and will be paid for—THE EDITORS.

SUGGESTIONS FOR FURNITURE DESIGN.

Ralph F. Windoes, Davenport, Ia.

We claim "the development of originality" to be one of the distinct aims of industrial training, but I am at a loss to understand how originality can be developed in the pupil when he is given a working drawing and told to make the article exactly as it is detailed. Little originality can be experienced in the actual making of the piece, but a great deal can be accomplished in the designing of it.

Let your boy select the article that appeals to him the most, show him a photograph or a number of pictures of such pieces, loan him a working drawing for his principal dimensions, and let him work up his own design. By so doing, the work is *his* from the start, and when it is finished he cannot truthfully say, "I get the credit, but the teacher did the work."

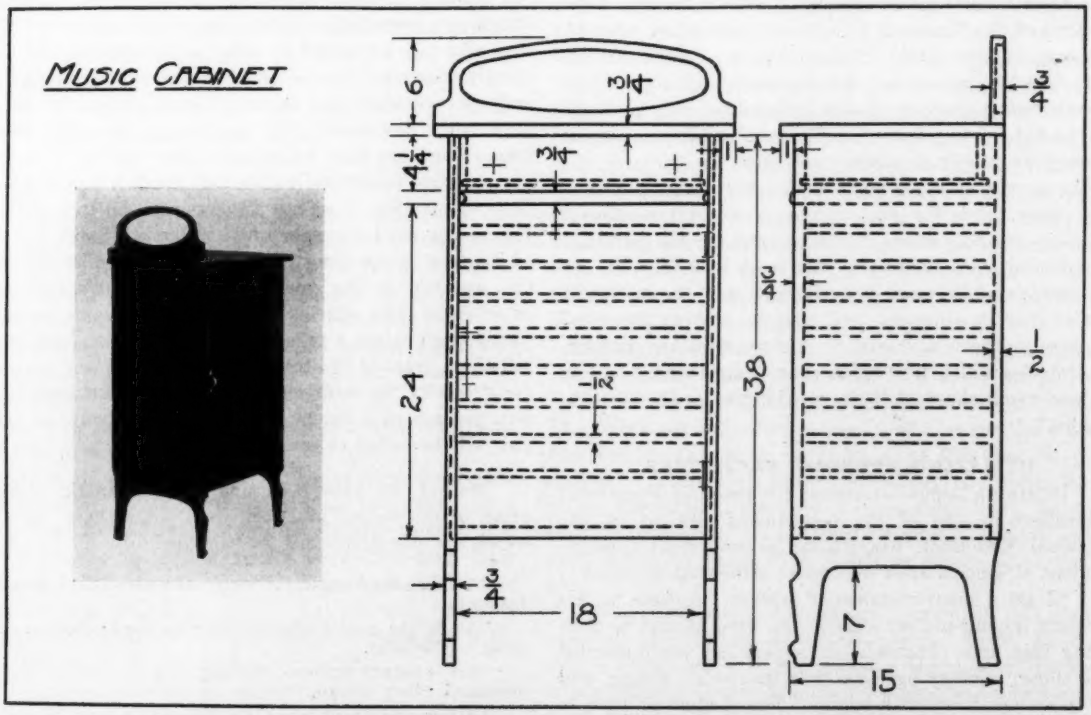
A Music Cabinet.

As an example consider the music cabinet illustrated. The boy decided that he desired a cabinet and elected it as his project. He was shown photographs and catalog illustrations for helpful suggestions, bearing in mind the kind of wood and the style of the furnishings in the room in which the piece was to be put to use. Very few pianos are made in "Mission" or straight-line designs, so this popular style was eliminated at the start. When he found something that did appeal to him, he was shown a working drawing of a similar cabinet for dimensions, and told to work up his own design, and one that would go well with the room furnishings. The cut of the cabinet with the drawing shows one boy's effort. Of course the boy is not cast entirely upon his own resources in making his drawing as the teacher must offer suggestions for guidance.

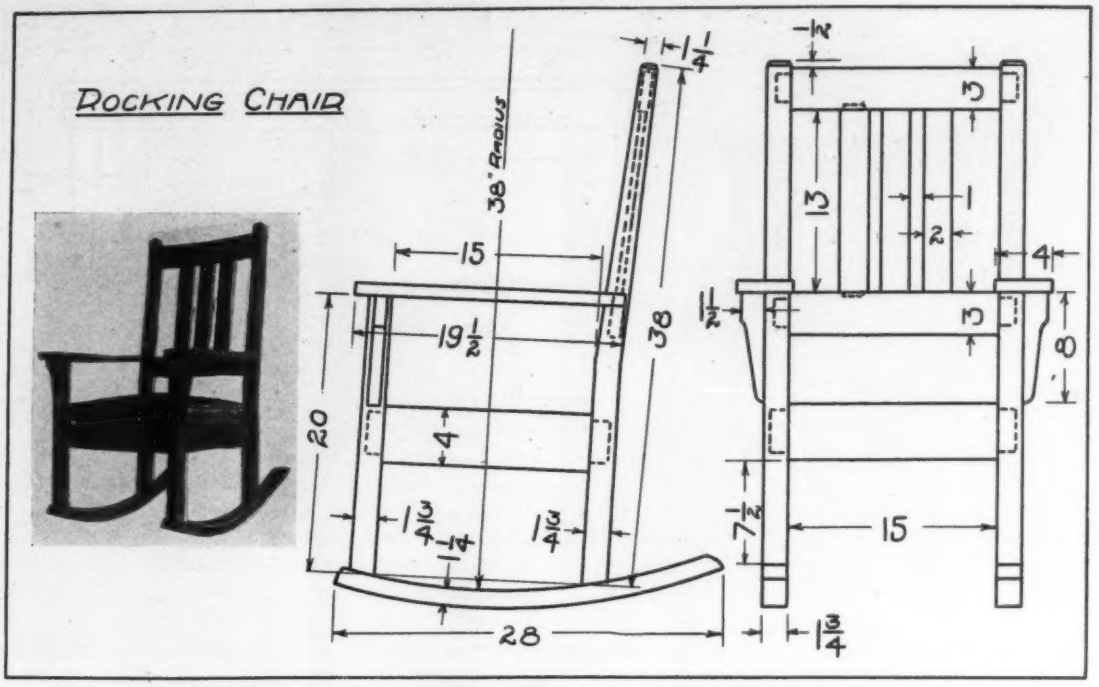
This method of design will not work out as easily in the grades below the seventh as it does with the older and more experienced boys of the upper grades, but it is a practice that should receive more encouragement than it does.

A very few suggestions concerning the pieces detailed may be of value to the teacher who cares to try out these projects in his class work.

The particular music cabinet illustrated was made of black walnut for the most part. The shelves are of three-ply birch, the drawer linings of beach, and the back of elm. Soft woods would do very well for these. The mirror is a bevel plate, fitted at the factory after the frame had been made. The mirror frame was screwed from the under side of the top before the latter was put into position. There are a number of ways of fastening the cabinet together, the most crude being to blind nail it. Another and better method is to use angle irons and straight plates. When the back is nailed in place it will add a great deal to the stiffness of the piece.



MUSIC CABINET DESIGNED AND MADE BY A STUDENT IN THE DAVENPORT SCHOOLS.



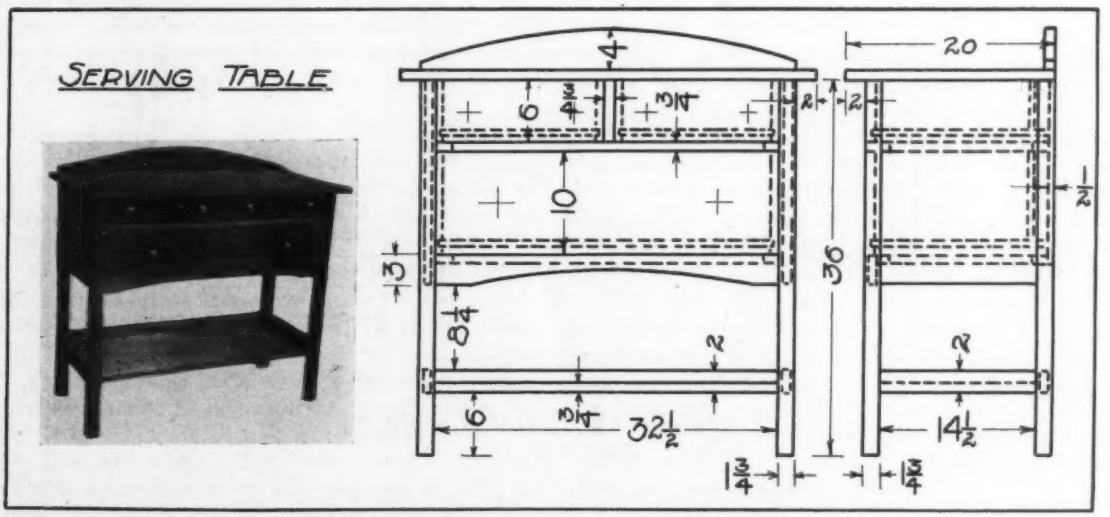
CHAIR DESIGNED AND MADE BY A STUDENT IN THE DAVENPORT HIGH SCHOOL.

The back is rabbeted into the sides for one-half inch, thus concealing it.

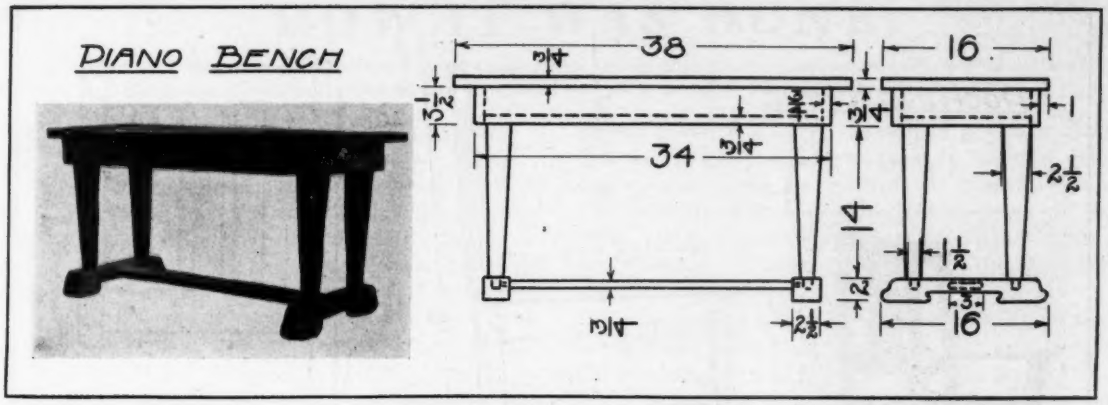
The rocking chair illustrated was made of quarter-sawed oak, and is on the "Arts and Crafts" order. The back stringers were steamed and bent over a wooden form having a radius of 40 inches. They add a great deal to the appearance of the chair, altho they may be made straight if the school has no method of steaming. The rockers were doweled to the legs, the arms and braces doweled, but the rest of the joints were all mortise and tenon. The cushion seat is a spring box made by a local upholsterer.

As a piece of dining room furniture, the serving table has come to be a very popular project with the boys. Its suggestions for design are limitless in the shape of the back piece and front stringers, the arrangement and size of the drawers. A great many changes can be noted which will make it conform with the general style of the other dining room furnishings of the student's home.

This particular table was made of oak and is rather plain in appearance. The sides were made solid and mortised into the legs. They could be built up as panels very acceptably. The back was rabbeted into the legs and nailed into place. The drawer slides were made as a frame and screwed into place from the inside, while



SERVING TABLE DESIGNED AND MADE BY A STUDENT.



DESIGNED AND MADE BY A STUDENT.

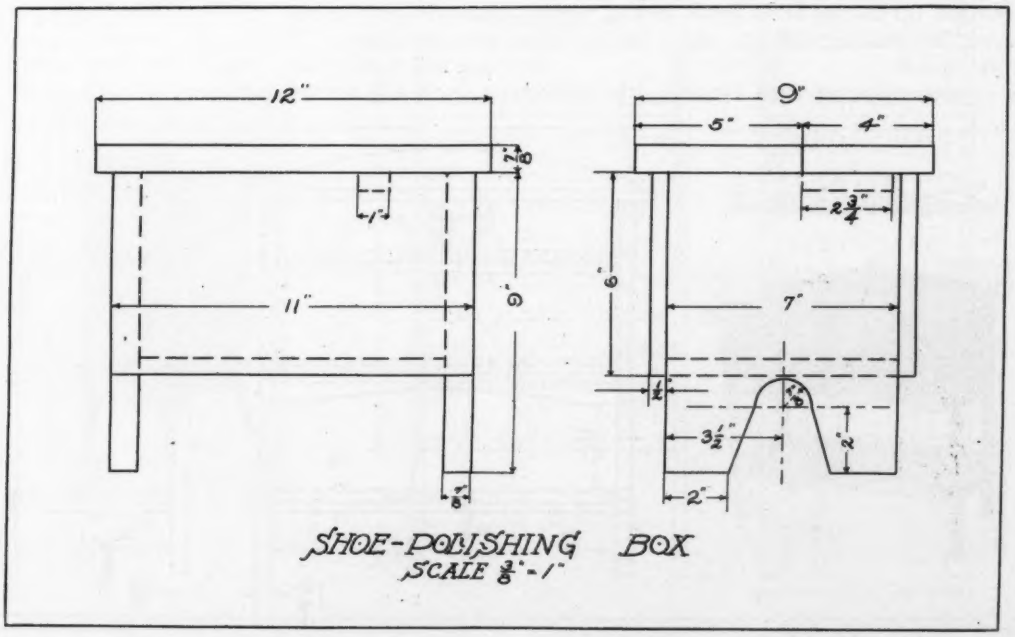
most of the remaining joints were mortise and tenon, as the drawing shows.

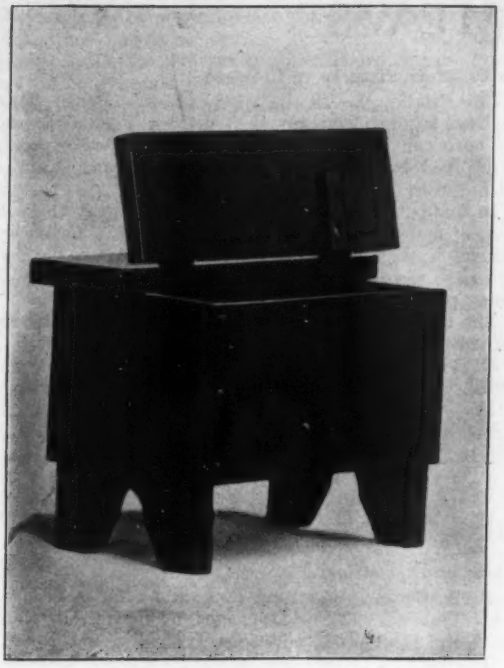
This popular piano bench will work up acceptably in any kind of wood. It offers suggestions for many designs as the legs can be made square, shaped, or turned. Also, the feet shapes can be easily changed. It has a hinged top, affording music space in the box, which has mitered corners. The bottom is blind nailed in the box very securely, and the legs are screwed into place thru the bottom of the box.

A NEW THING IN SHOE-POLISHING BOXES

Wm. V. Winslow, Supervisor Manual Arts, Adams, Mass.

In looking over work done by manual training classes occasionally we come across boxes for use in polishing the shoes. However, many of these boxes require more time to construct than most teachers would care to take and they further require more lumber than some towns would care to have used for the purpose. The most convenient box of this nature is one which is most simple of construction, and one which, owing to the fact that it is small requires little lumber. With this box the shoes are polished while sitting.





The Shoe Box (Open).

Boy Using Box Made by Himself.

The box can be made of whitewood thruout, the sides being put on with screws, the bottom and top with nails, and hinges used in joining the two top boards. It is a good problem for the upper grades, requiring the use of the expansive bit and the common bench tools. Great care must be exercised in laying out the two edges which are joined with hinges to form the top.

Such a problem results in a serviceable acquisition to the home, having a social, as well as a practical, value.

SUGIED CYPRESS

O. Frank Carpenter, Monmouth, Ill.

JAPANESE SUGI work has been done in numerous places, but only so far as small articles are concerned, such as glove boxes and serving trays, etc. It has been successfully used in interior decorations, entire walls being paneled in the most beautiful design, but perhaps few people have gone so far as to attempt making furniture of cypress.

Having made several of the articles mentioned above, in the Manual Training Department, and finding that "Sugi" finish was highly practical, we decided to attempt a larger piece and designed a chair which has proven to be a very satisfactory piece of furniture.

The cypress should be selected, with as curly a grain as possible and free from checks; and it is very necessary that it be thoroly seasoned. It is then ready to be "Sugied."

After the article has been glued up, secure a gasoline torch, similar to those used as paint burners, or better still, a blow torch and scorch the wood on all sides, ends and edges. Take care not to burn the work or to hold the torch too long at a joint as heat has a tendency to crack the glue. "Sugi" both sides of a piece as rapidly as possible or else it will be apt to warp slightly as all the moisture is driven to one side or the other.

Now, after the entire article has been scorched thoroly, use a wire brush, brushing out the dust and charred wood and taking care again to brush with the grain. This takes out the soft parts and leaves the hard grain in relief. As light a finish as may be desired can be had by more or less brushing. When the desired tone has been attained, take an ordinary bristle scrub brush and go over it again getting out all the remaining loose dust.

The finish may now be put on. A coat of shellac and varnish may be applied, or just wax. "Sugiing" causes the wood to harden and become lighter so that it makes a very satisfactory chair. The Southern Cypress Manufacturers' Association publishes a small free pamphlet on "Sugied Cypress" that gives a thoro treatment of the finish. Cushions of Spanish grain leather match the wood exceptionally well.

BOOK REVIEWS

Industrial Education in the Elementary School.

By Percival R. Cole. 65 pages. Price, $0.35. Houghton Mifflin Co.

This is one of the Riverside Educational Monographs edited by Dr. Henry Suzzallo. It is divided into five chapters with the following suggestive headings: I, The Ancient View of Industry and Industrial Education. II, The Modern View. III, The Present Problem of Industrial Education. IV, The Necessary Reconstruction of the School Curriculum. V, The Necessary Reconstruction of School Method.

Under these headings, intensely interesting and thoughtful discussions are given in a very clear and practical way. The little volume will abundantly repay a careful reading by any teacher.

Foods and Sanitation.

By Forster and Weigley. 400 pages. Row, Peterson & Company, Chicago and New York.

There are several features of this text which seem to place it in an advanced position as a text for high-school girls.

First, the authors themselves have had extended and successful experience as high-school teachers of Domestic Science. Hence, they have avoided the too formal and technical discussions which are so abundant in the ordinary texts.

Second, the book in manuscript form has been tried several years under the closest scrutiny, and discovered defects or weaknesses either in subject matter or in method, have been corrected or eliminated.

Third, it is one of the few texts along this line which make a great deal of the psychological approach to the subjects involved. Both the matter and the method seem peculiarly adapted to the bringing about of the largest interest, to the developing of the thoughtful and inquiring attitude, and to the establishing of fundamental principles in the minds of the girls. Thus the authors hope that the girls may acquire the "scientific attitude toward household affairs" and the skill to "perform her duties of a housekeeper with more intelligence, greater interest, less labor, and better health and happiness to herself and her family."

Discriminating questions following the discussions, are such as to provoke intelligent and independent thought in the application of principles.

The Appendix is an alphabetical tabulation of the food values of innumerable articles of food.

The book is well printed and bound, is especially rich in reference material suitable to high-school use, and is well and fully illustrated.

The Use of the Plant in Decorative Design.

For the Grades. By Maude Lawrence; Caroline Sheldon. Twenty-three plates and frontispiece with notes. Scott, Foresman & Company, New York, Chicago.

These plates are bound in paper covers of tasteful design and give examples of beautiful drawings and decorative units from natural plant forms.

Ten of the plates are in delicate, subdued colors of remarkable harmony and beauty.

The units are simple and varied.

Explanatory notes refer to the derivation and application of the units. The book should help the grade teacher who is seeking suitable material for decorative application.

The final plates in the book show some excellent examples of decoration with colored crayons and patterns for the construction of candle shades.

The last page gives color scales of intensity and values.

How to Show Pictures to Children.

By Estelle M. Hurll. 138 pages. Price, $1.00. Houghton Mifflin Company, Boston, New York, Chicago.

There can be no question of the value of appreciation derived by children from the intelligent study of good pictures.

In this little book the author has given more than the review of a few choice pictures. She has established and described a method of presenting pictures to children which is so sensible and effective that teachers and mothers may profit very much by following it.

The titles of the chapters suggest the contents of this helpful book. They are:

II. The Child and The Picture.
III. How Pictures are Made.
IV. How To Make Pictures Tell Stories.
V. The Game of Picture-Posing.
VI. Practical Suggestions to The Mother.
VII. The Use of Pictures in The Schoolroom.
VIII. Animal Pictures.
IX. Pictures of Children.
X. Story Pictures.

Architectural Drafting.

By A. Benton Greenberg, B. A. and Charles B. Howe, M. E. Quarto, VIII + 110 pages, 53 figures, 10 plates. $1.50 Net. John Wiley and Sons, Inc., New York, N. Y.

The authors of this book make no attempt to present a complete or unified course of instruction but rather to give essential information on architectural drafting practice. This is undoubtedly preferable to the presentation of exact problems, which at best, can only conform to the needs of comparatively few localities.

The first section of the text is devoted to a list of the implements and their proper use.

In the second section the theory and practice of architectural drafting is stated and illustrated.

Following these sections, the parts of ordinary buildings are shown and constructions in various materials are described and illustrated.

A chapter on design emphasizes the fundamental principles of utility, beauty expression, proportion, arrangement and style in architectural forms.

In the appendix, specifications and estimates are discussed.

The book should be helpful as a reference text in high-school courses in this important subject.

Agricultural Drafting.

By Charles B. Howe, M. E. Quarto, X + 63 pages, 45 figures, 26 plates. $1.25 net. John Wiley & Sons, Inc., New York.

This text is well suited to fill the demand of schools offering the practice and application of mechanical drawing to agricultural study. It is not a manual for self instruction, but a text to be used under personal instruction. The first chapters are devoted to general instructions on mechanical, agricultural drawing, with definitions and methods.

The later chapters give detailed instruction on building construction peculiar to farm needs and on topographical drawing.

The Job, the Man, the Boss.

By Dr. Katherine M. H. Blackford and Arthur Newcomb. 266 pages. Price, $1.50 net. Doubleday, Page & Company, New York.

In the words of the author, the purpose of this book is to put the right man in the right job. It is an exposition of the "Blackford system" for employing men and women. It explains the method of character analysis, by

observation of the general characteristics of the individual. It classifies people according to their physical characteristics, and gives the type of work for which each type or class of individuals is best adapted. It also gives the method by which each vocation may be analyzed and the necessary qualifications of the individual who is to make a success in that vocation. Considerable space is devoted to a discussion of the methods to be used in handling the different types of persons.

The work is suggestive to teachers, parents and employers and is especially interesting to those who are endeavoring to find a solution of the intricate problem of Vocational Guidance.

The Public Schools of Springfield, Illinois.

Educational Section of the Springfield Survey conducted under the direction of Leonard P. Ayres. Price, 25 cents. Russell Sage Foundation, Division of Education, 130 East 22d St., New York.

The report devotes several chapters to the problem of vocational education, and a possible solution in a medium sized city of the Middle West.

Proposed Terminology for Vocational Education.

Presented by the Committee upon Vocational Education and Vocational Guidance, at the meeting of the National Education Association in St. Paul. Robert J. Fuller, Supt. of Schools, N. Attleboro, Mass., Chairman.

Vocational Guidance.

United States Bureau of Education, Bulletin No. 14, whole number 587; 1914. Papers presented at the Organization meeting of the Vocational Guidance Association, Grand Rapids, Mich., October, 1913.

University Extension in the United States.

By Louis E. Reber, Dean of the University Extension Division, University of Wisconsin. United States Bureau of Education, Bulletin, 1914, No. 19.

Elementary General Science, Book I.

Percy E. Rowell. Cloth, 200 pages. Price, 60 cents. Published by the A-To-Zed School, Berkeley, Cal.

There is a widespread feeling among school people that there is need of greater attention to the great scientific facts which may be made familiar to children by discriminating use of the common things of their environment. Mr. Rowell has undertaken in Elementary General Science to organize a body of material along this line for use by "pupils who are about 10 or 11 years old."

The very simplest apparatus improvised from the commonest of everyday conveniences, are suggested and illustrated for the experiments. The author has arranged his material under the following heads: The Sun, Stars, and Planets; Light; Heat; Air; Water; Plants and Animals; Food; Mechanics; Magnetism and Electricity; and Arts and Industries. This is a very suggestive treatise and should be welcomed by those who hope for more thoughtful and practical science work in the elementary schools.

Occupations and Industries Open to Children.

By Anne Davis. With an introduction by W. M. Roberts, District Superintendent of Schools. 20 pages.

This pamphlet is a frank unvarnished statement of the leading lines of employment open to children, between the ages of 14 and 16, in the city of Chicago.

The unfavorable view given of such employments as errand and messenger service, boxmaking, candy manufacturing, department store work, etc., may not be relished in some quarters but it will warn children and their parents against "dead-end" jobs.

Report of Committee on Continuation Schools.

Warren E. Hicks, State Inspector of Industrial Schools, Madison, Wis.

Gives the recommendations of the Committee on terminology and the definitions of terms dealing with continuation schools.

"Suggestions for Teaching Cooking and Sewing in the Country Schools of Wisconsin" is the title of an illustrated bulletin issued by State Superintendent C. P. Cary for Wisconsin. It was prepared by Miss Emma Conley, State Inspector of Domestic Science.

HOUSTON EXTENDS MANUAL TRAINING.

THE extension of the city limits of Houston, Tex., during the past two years has involved a considerable expansion in the school facilities of the community and has been accompanied by a corresponding broadening of the manual training courses and equipment. Two small high schools, formerly in suburbs of the city, have become part of the school system. In both, industrial arts instruction is offered. One of the schools is equipped for benchwork and mechanical drawing, and the second for benchwork and drawing.

In the near future, two junior high schools will be completed to be known respectively as the North End and South End Junior High Schools. The former will cost $150,000 and will have a large equipment for woodworking and mechanical drawing including cabinetmaking, patternmaking and benchwork. The South End School will represent an expenditure of $350,000 and will be equipped far cabinetmaking and benchwork, patternmaking and molding, wood-turning and mechanical and architectural drawing.

In addition to the regular manual training activities there will be special courses in vocational and pre-vocational work in both Junior High Schools. Forging and machineshop work for the last two years of high school have been arranged for in the Central High School.

The arrangement of machinery in the North End Junior High School is interesting and novel. The woodworking machines are driven from a line shaft and counter shafts, arranged in pits underneath the machines and accessible thru removable sections of the floor. This makes it possible to have enclosed belting, doing away with the vibration of hanging shafting and unsightly obstructions to view. It also enables the easy handling of lumber due to the elimination of overhead. The patternmaking room is arranged for motor-driven machinery.

In the South End building, the machinery in the cabinet and pattern shop is arranged for motor power, while the wood-turning room is equipped for belt-driven lathes.

The Manual Training Department of the Houston Public Schools is conceded to be the largest in the South and includes a corps of seventeen instructors and 32 shops. It is in charge of Mr. E. M. Wyatt.

THE CONNECTICUT STATE TRADE SCHOOL at Bridgeport has added a linotype machine to the equipment of the printing department. A complete course in machine composition will be offered in the school.

PONTIAC, MICH. The new high-school building, which will be thrown open to students in the fall, will contain fully equipped departments for manual training and domestic science work.

EL PASO, TEX. Printing has been added to the list of courses at the San Jacinto School. A printing press has been installed at a cost of about $775.

OAKLAND, CAL. The board of education is planning to open a vocational school about February, 1915. The school will be especially adapted to the needs of children who expect to go to work at the completion of their elementary school course.

THE NEW YORK SCHOOL OF FINE AND APPLIED ARTS conducted its recent summer session in a new building at Belle Terre, L. I. Nearly two hundred students were enrolled.

REPORT OF THE NATIONAL COMMISSION ON VOCATIONAL EDUCATION

THAT national grants be given to the individual states of the Union for the purpose of stimulating vocational education in agriculture and in the trades and industries; that these grants be given in two forms, one to provide for the training of teachers, and the other to be used as part payment of teachers' salaries, and that appropriations be made to a federal board for making studies and investigations which shall be of use in vocational schools, are the fundamental recommendations made to Congress in the report of the commission on national aid to vocational education. A bill providing a scheme of federal grants to aid vocational education is submitted to the congress in the report.

In a summary of the total amounts to be paid out to the individual states in federal grants to aid vocational education, under the proposals in the bill prepared by the commission, a total of almost $50,000,000 would be distributed to the states in the ten-year period between 1916 and 1925.

Rapid Survey Made.

The commission, after being appointed by President Wilson made a rapid survey of the problem of national aid to vocational education and drew up a report that replies favorably to the question: "Shall the federal government aid the individual states in establishing vocational education?"

The commission organized April 2, 1914, and completed its labors in June. A mass of statistical information and a scheme of appropriations for national grants, increasing each year thruout a period of years, is contained in the report. These appropriations are carried in the bill, proposed by the commission, and introduced in Congress in June last.

Recommendations.

The recommendations of the commission, in full, follow:

I. Scope of the Grants.

1. That national grants be given to the states for the purpose of stimulating vocational education in agriculture and in the trades and industries.

2. That grants be given in two forms: (a) For the training of teachers of agricultural, trade and industrial and home economics subjects. (b) For the paying of part of the salaries of teachers, supervisors and directors of agricultural subjects and of teachers of trade and industrial subjects.

3. That appropriations be made to a federal board for making studies and investigations which shall be of use in vocational schools.

II. Amount of the Grants.

1. For the salaries of teachers, supervisors, and directors of agricultural subjects—that there be appropriated to the states the sum of $500,000 for the fiscal year 1915-1916; this amount to be increased at the rate of $250,000 a year until a total of $2,000,000 is reached in the fiscal year 1921-1922, and thereafter the annual increase to be at the rate of $500,000 a year until a total maximum appropriation of $3,000,000 is reached in 1923-1924.

2. For the salaries of teachers of trade and industrial subjects—that there be appropriated to the states the sum of $500,000 for the fiscal year 1915-1916; this annual amount being increased for each subsequent year in the same manner as the grants for the teachers of agricultural subjects until the same maximum of $3,000,000 is reached in 1923-24.

3. For the training of teachers of agricultural, trade and industrial, and home economics subjects—that there be appropriated to the states the sum of $500,000 for the fiscal year 1915-16; $700.000 for the fiscal year 1916-17; $900,000 for the fiscal year 1917-18; $1,000,000 for the fiscal year 1918-19, and annually thereafter.

4. For the work of the federal bureau for vocational education—that there be appropriated $200,000 annually, this money to be used in administering the grants to the states and in furnishing information and advice to the states for use in vocational schools and classes.

The maximum when each case above is continued annually thereafter.

III. Kinds of Schools Aided by Grants.

1. That the schools aided in part by the national government should be schools supported and controlled by the public.

2. That the education given in these schools should be of less than college grade.

3. That they should be designed to prepare boys and girls over fourteen years of age for useful or profitable employment in agriculture and in the trades and industries.

4. That the schools should be of three types in order to meet a variety of needs: (a) All-day schools in which practically half of the time should be given to actual practice for a vocation on a useful or productive basis; (b) part-time schools for young workers over fourteen years of age, which should extend either their vocational knowledge or give preparation for entrance to a vocation or extend the general civic or vocational intelligence of the pupils; (c) the evening schools for mature workers over sixteen years of age to extend their vocational knowledge.

IV. Administration.

1. That the states, in order to receive national grants for vocational education, designate or create state boards, thru whom the national government would deal; the determination of such boards to be left entirely to the states.

2. That a federal board be created, consisting of the postmaster-general, the secretary of the interior, the secretary of agriculture, the secretary of commerce and the secretary of labor, with the commissioner of education as its executive officer, to administer the funds and to co-operate with the states in promoting vocational education.

V. Conditions.

1. That the federal statute providing for national grants to the states for vocational education set up conditions safeguarding the proper expenditure of the money for the purposes designed, and insuring a minimum degree of efficiency in the work.

2. That the states, thru their legislative authorities, formally accept the conditions of the federal statute providing national grants.

3. That the states provide for the proper custody and disbursement of the federal grants allotted to them.

4. That the state board, with the approval of the federal board for vocational education, formulate plans for the administration of the grants in conformity with the provisions of the federal statute, and establish minimum requirements for the state as to the qualification of teachers and the equipment of schools.

5. That for each dollar paid from federal grants allotted to any state for the salaries of vocational teachers or for the training of vocational teachers, the state or local community, or both, shall expend an equal amount for the same purpose, and shall in addition meet all other costs of plant, equipment, and maintenance, including the salaries of all teachers necessary to complete well-rounded courses of instruction.

6. That the state receive its allotment annually so long as it uses the funds allotted to it in conformity with the purposes and provisions of the federal statute. Payment on allotments shall be made quarterly.

Task Too Great for States.

That the task of providing adequate education for wage earners is far too stupendous for the individual states, is the finding of the commission, which discusses "the size of the problem" as follows:

According to the census of 1910, there were 12,659,203 persons in the United States, both male and female, engaged in agriculture. While it is impossible to secure accurate figures, it is probable that less than one per cent of these have had adequate preparation for farming. This means that there are over 12,000,000 people engaged in agriculture in this country who are not trained to deal with the soil in such a way as to make it produce thru scientific methods, what it should yield in order to sustain the present and future life of this nation.

Proportion Small.

Engaged in manufacturing and mechanical pursuits and allied industries there were 14,261,376. It is equally correct to say that not one out of every hundred of these workers have had or are having at the present time any adequate chance to secure training.

The American people have hardly begun the work of providing for the practical education of these millions of our wage workers. In this whole country there are fewer trade

schools than are to be found in the little German kingdom of Bavaria, with a population not much greater than that of New York City. There are more workers being trained at public expense in the city of Munich alone than in all the larger cities of the United States, representing a population of more than twelve million. It is substantially true that practically every German citizen who could profit by it may receive vocational training for his lifework in the schools and classes supported out of the public treasury. Since commercial prosperity depends largely upon the skill and welding of our workers, the outlook for American commerce, in competition with that of our German neighbors, is under present conditions not very promising.

Social Obligation.

To provide in our educational system some opportunity for our workers to improve their efficiency and thereby better their own and the communities' well-being, is a social obligation which cannot be avoided with impunity. But, disregarding for the moment this obligation, even to replace the annual mortality and superannuation of our great army of workers, each year one million young people are required. Simply to maintain the ranks of our working population, therefore, the immediate problem of vocational education is the problem of equipping for the successful pursuit of some useful trade or occupation the youth who go to work at the rate of more than one million a year.

If it be assumed that three years' special training are required by each one to prepare for a calling, our vocational schools must provide for the continuous instruction of more than three million persons, without taking into account the work which should be done in behalf of the millions more of untrained adult workers already on the farm and in the shop or making any allowance for the growth of our population or of our industries. For this great task the facilities and resources of our public schools are entirely inadequate without the help of the larger resources of the national government.

Crying Economic Need.

"There is a crying economic need for vocational education," the commission says. Only thoro-going agricultural education, "making the farmer an intelligent user of the natural wealth with which Providence has blessed us as a people, can restore and preserve our boasted agricultural supremacy," the report said, and further explains:

"American agriculture has prospered in the past because it rested on the basis of the richest soil in the world—a fertility, which, with the usual prodigality of this people, has been treated as if it were inexhaustible."

The American manufacturer has prospered in the past by forces that either were natural, inventive or possessed organizing ability, but from now on "the conservation and full utilization of our natural resources can be accomplished only in proportion as we train those who handle them."

Vocational training also is needed to prevent waste of human labor, the commission finds.

Vocational education is needed to provide supplemental apprenticeships and is needed to increase wage earning power, the report points out; also is it needed to meet the increasing demand for trained workmen and to offset the increased cost of living.

Wise Business Investment.

"Vocational education is a wise business investment," the report said. "In the last analysis expenditure of money for vocational education is a wise business investment, which will yield larger returns, not only in educational and social betterment, but in money itself, than a similar amount spent for almost any other purpose. The commission recognizes that boys and girls cannot be valued in terms of dollars and cents, save as these represent returns in social well-being, both to themselves and to society. . . . . There are more than twenty-five million persons eighteen years of age and over in this country engaged in farming, mining, manufacturing and mechanical pursuits, trade and transportation.

"If we assume that a system of vocational education, pursued thru the years of the past, would have increased the wage-earning capacity of each of these to the extent of 10 cents a day, this would make an increase in wages for the group of $2,500,000 a day, or $750,000,000 a year, with all that this would mean to the wealth and life of the nation. This is a very modest estimate, and while no complete figures are available, it is probably much nearer 25 cents a day, which would make a total increase in wages of $6,250,000 a day and $1,875,000,000 a year."

STUDENTS OF THE LANE TECHNICAL HIGH SCHOOL, CHICAGO, ASSEMBLING MOTOR HEAD LATHES.
The Students have made 25 of these Machines.

GENERAL NEWS NOTES

THE ANNUAL CONFERENCE AND INSTITUTE OF WISCONSIN TEACHERS OF INDUSTRIAL SUBJECTS will be held at Milwaukee on September 2, 3, 4. All teachers employed in the continuation, trade, commercial and evening schools of the Badger state have been invited by State Superintendent of Industrial Education, Warren E. Hicks, to attend. Thirty-six topics, each to be treated by three persons, have been arranged for, and, in addition, five speakers have been engaged for formal addresses.

Information concerning the Institute may be had from Superintendent Hicks.

PHILADELPHIA, PA. Twelve additional shops for manual training purposes will be established in as many public schools as the first step in the enlargement of industrial education activities. The conversion of ordinary classrooms into manual training shops will necessitate considerable carpentry work. All of this will be performed by the pupils of the department.

DAYTON, O. Upon the suggestion of Supt. E. J. Brown, the board of education proposes the establishment of a part-time co-operative school for boys sixteen years or older. The school will provide opportunity for apprentices in the trades to attend school while working.

BALTIMORE, MD. The school board committee has recommended to the board that an extension be made of the work in household arts in the Eastern and Western High Schools so as to include an elective course in dressmaking, and has requested that it be put into effect with the opening of the schools in September. Provision will be made for additional teachers and equipment to carry on the work.

UPON the suggestion of W. Stanwood Field, Director of Continuation Schools in the Boston Public Schools, the school board has adopted a new salary schedule providing for more liberal compensation of teachers in these schools. The schedule provides for four classes of teachers as follows: Instructors and trade instructors will begin with a salary of $1236 and go to $1524 on a basis of $72 a year advance; trade assistants begin at $996 and go to $1284, with the same yearly advance, and assistants will begin with $840 and may go to $1344, also at the rate of $72 a year advance.

A PLAN whereby rural graded schools can maintain a manual training department and offer courses as complete as those in villages, is being promoted by Supt. J. E. Calavan of Clackamas County, Oregon.

Mr. Calavan's plan calls for an agreement to be entered into by a group of six school districts for the salary and transportation expenses of a teacher of manual training. Each of the six schools is to equip a shop with benches, tools, lumber, etc., in which classes can be conducted during one day each week. The boys of the fifth and sixth grades are to constitute the lower division and the boys of the seventh and eighth grades, the higher division of the shop class. Mr. Calavan estimates the initial cost of tools and materials at $100 for each school, and the monthly expense for salary at $25.

STERLING, ILL. The Manual Training Department of the high school has been reorganized and enlarged providing for separate departments for the Mechanical Drawing and Manual Training Classes. The first part of the year will be devoted to the construction of furniture to be used in the school. It is planned to have the boys spend a part of the time in local factories in order that they may obtain practical experience.

EVANSVILLE, IND. At a recent meeting of the city and state school authorities, in connection with the installation of vocational training in the high school, plans were discussed for the making of a thoro survey of the industries of the city, the appointment of an advisory committee of representatives from the factories, the extension of the regular school course to cover special needs, and the introduction of manual training into the sixth and seventh grades.

The vocational work will be begun in the Manual Training Department of the high school where special equipment and instructors are available. Among the subjects to be taught are sheet metal and machineshop work, carpentry, electrical construction, draughting, homemaking and domestic science. In addition arrangements will be made for classes for workmen who are already skilled but who want to learn the principles of their respective trades.

EVERETT, WASH. The school board has taken up, thru the buildings and grounds committee, the extension of the trade courses to include printing and plumbing. An effort will be made to learn what demand for these courses exists. The initial cost of printing equipment is estimated at $600, while the plumbing course can be started with an investment of about $100.

UPON the suggestion of Supt. R. E. Denfeld of Duluth, Minn., the school board has endorsed the plan to have the school printing taken in charge by the Manual Training Department. It was pointed out that most of the large schools of the country have supplied themselves with equipment. The estimated cost of equipment for the Duluth schools is $1,000.

THE school board of Springfield, Ill., is considering the elimination of the printing department in the high school, and the transfer of the same to the regular Manual Training Department. The board members have expressed their dissatisfaction with the venture, declaring that the freedom which comes with such work causes the students to waste time and prevents them from getting the proper benefit from the time spent.

HARTFORD, CONN. A cooking room has been provided for the Southwest School. Arrangements have been made permitting girls of the eighth grade to take cooking in place of sewing.

DETROIT, MICH. Beginning with September, a course in "house planning" will be put into operation at all the high schools. The course will be patterned after that adopted in the Eastern High School and will include not only the drawing of plans for houses, garages and buildings of various sorts, but also the erection of the buildings from the foundation to the inside finishing and painting. It is the aim of the instructors to familiarize those who take the work with the technical terms, apparatus, materials, prices of materials and systems of construction. The knowledge gained of timbers, lumber, finishing and fair prices for work is expected to benefit those who later on must select or build their own homes.

The students of the Eastern High School have completed an automobile garage which will be sold at public auction. The money, over and above expenses, will become a part of the fund used in the purchase of materials for the "house planning" course.

STATE SUPERINTENDENT T. H. HARRIS of Louisiana, in a recent official letter, has commended the Natchitoches Parish (County) School Board for inviting the country boys from all sections of the parish to assemble for a week's study of agriculture. Each rural school elected for this week's institute one or more representatives and the 68 chosen boys were given free entertainment in the homes of the people of Natchitoches. The boys showed great

interest in the work of the institute, and joined earnestly and intelligently in the discussion of agricultural questions.

PHILADELPHIA, PA. A course in salesmanship is offered in the William Penn High School, enabling girls to earn a living while pursuing the course of study. Classes are open to all girls who have completed two years' work in the commercial department of the school and the hours are such that the students may work in the afternoon.

The new course has been established in an effort to assist girls who, thru necessity, are compelled to work at the end of the second year of high school. The school has in training an oversupply of stenographers and accountants and an effort will be made to provide trained clerks capable of demanding high wages.

ATTLEBORO, MASS. The school board has ordered that tool-making be introduced in the vocational school.

POTLATCH, IDA. Students of the Manual Training Department of the public schools have undertaken the construction of a modern seven-room dwelling house. The local lumber company furnished the lumber. The boys entered into a contract with the trustees of the local church for the erection of the house as a church parsonage. In addition to the money which the boys will be able to earn will be the actual experience gained in building construction.

GRESHAM, ORE. Domestic Science has been introduced in the public schools.

THE NEW YORK EDUCATIONAL ALLIANCE, during the summer months, conducted a practical trade course to enable girls just out of the grammar grades of public schools to begin employment at higher wages than formerly. Sessions were held for a period of six weeks with an attendance of more than one hundred girls. The subjects studied included needlework, making of shirt waists, skirts, underwear and other articles of dress manufactured extensively in the clothing factories. In addition, instruction was given in millinery, from the making of frames to the trimming. The work was in charge of Miss Elkus, Director of Woman's Work of the Alliance.

SEATTLE, WASH. The school board has increased the number of industrial centers from nine to eleven. Modified forms of these centers are to be opened in two additional schools.

BOSTON, MASS. A branch of the Trade School for Girls will be established in the North Bennett Street Industrial School.

EL PASO, TEX. An additional year has been added to the Domestic Science work in the high school. In the past the subject has been limited to the first year.

THE PRINTING CLASS of the Manual Training Department of the Perth Amboy, N. J., schools completed, during the past year, a considerable amount of "job work" for the Perth Amboy school department. Among the particularly creditable examples are: library record cards, Directory of the Manual Training Department, programs for school entertainments, school record transfer cards, letter-heads, invitations to the annual school exhibit, etc. One of the most interesting achievements of the Printing Class is a voucher form, laid out and printed in accordance with the requirements of the New Jersey State Accounting Department. The form, as well as the school record cards, are intricate problems in rule work and exhibit not only considerable ingenuity but also a high grade of workmanship.

PERSONAL NEWS NOTES.

MR. THOMAS G. RUSSELL has resigned as director of Manual Training at Wellsville, N. Y., to accept a similar position in Dunkirk, N. Y.

STREATOR, ILL. Mr. Garland Conner, of Sullivan, Ind., has been elected Supervisor of Manual Training to succeed Earl M. Bumgarner.

ROCKLAND, ME. Miss Anna Webster has been elected teacher of Domestic Science to succeed Miss Marie Gurdy, who has become connected with the University of Maine extension work.

MISS GENEVIEVE FISHER has been elected instructor in Domestic Science and the Misses Elsie French and Lora Thompson, instructors in Domestic Art at the University of Iowa, Ames, Ia.

ARKADELPHIA, ARK. A Manual Training Department has been added at Ouachita College with Mr. B. A. Stovall in charge.

OTTAWA, ILL. Miss Jane Snow has been appointed instructor in Household Arts, Mr. J. A. LaBaw in Manual Training, and Miss Fanny J. Kimball in Drawing and Music.

LEBANON, IND. Mr. T. B. Demaree has been elected head of the Manual Training Department of the high school.

MISS LOUISE PEIRSON, of Bloomington, Ill., has been appointed teacher of household sciences in the Hawaiian College at Honolulu.

LEON, IA. Mr. Fred Ehrhardt, of Elkader, has been appointed head of the new Department of Manual Training.

ROSEBURG, ORE. Mr. A. O. Horning, of Lafayette, Ind., has been appointed head of the Manual Training Department succeeding D. E. Atcheson.

MARSHFIELD, WIS. Mr. R. J. Carver has been newly appointed as principal of the Industrial School.

MISS MARY SCHELL, for the past year and a half Supervisor of the Logansport, Ind., Industrial School, has accepted a position at the Mrs. Blake School at Indianapolis.

SOUTH HAVEN, MICH. Mr. Elzie Clifford has been appointed Director of Manual Training. He succeeds Mr. Chas. S. Nichols who recently resigned to accept another position. Both young men are graduates of the Western Michigan Normal, at Kalamazoo.

MR. O. B. BADGER, who for five years has been head of the high-school Manual Training Department at Columbus, O., has resigned to accept a similar position at Fargo, N. D.

CAMDEN, ARK. A Domestic Science Department has been established with Miss Lola G. Kyser, of Lowell, Mich., in charge.

LOGANSPORT, IND. Miss Florence Ward, of Galesburg, Ill., has been appointed as head of the Industrial School kindergarten classes, succeeding Miss Schell.

MR. G. W. STAINS, who for the past year has been in charge of the Manual Training Department of the public schools at Aibonito, Porto Rico, has resigned and returned to his home at Kansas City, Mo.

MISS HARRIET B. GARDNER has been appointed instructor in Domestic Science at Lincoln College, Lincoln, Ill.

MR. EUGENE A. TAPPY, for the past three years head of the Manual Training Department of the Joliet Township High School, Joliet, Ill., has accepted a new position at the Nicholas Senn School in Chicago.

MR. FRANK H. SHEPHERD, Director of the Manual Training Department of the State Normal School, Maryville, Mo., has resigned to become the head of the Department for the Training of Teachers in Manual Training and Industrial Arts in the State Agricultural College at Corvallis, Ore.

DOMESTIC SCIENCE has been introduced at the University of California, Berkeley, with Miss Mary F. Patterson as professor and head of department.

L. C. DEWEY has resigned as director of manual training at Manitowoc, Wis. He will be succeeded by A. M. Bleyer of Milwaukee.

MOUNT PLEASANT, MICH. The Manual Training Department, under the direction of Mr. Hodgins and a competent builder, are contemplating the building of a Manual Training Shop in connection with the present high school. The building, as planned, is to be one story high, but built so that another story may be added at any future time. The total cost of material has been carefully estimated at between $2,700 and $2,800. Mr. Hodgins has asked the city for $1,200 this year, and the balance next, as he figures that it will take at least two years to complete the structure with student labor.

NOW, ARE THERE ANY QUESTIONS?

Readers are urged to ask questions concerning the Industrial Arts. The editors will reply to those questions which they feel that they can answer, and to other questions, they will obtain replies from persons who can answer them authoritatively. Questions should be addressed to THE EDITORS.

Cement Finish.

New Bedford, Mass. Q:—After reading Mr. Winslow's article, "An Elementary Problem in Portland Cement," I should like to ask what kind of a surface is procured on tiles constructed and finished as he describes and if it would be possible in any way to give them a bright glazed finish?

A:—The surface in this instance was simply finished by rubbing with the Carborundum stone. A very smooth finish may be made by using a fine grade stone. The only cement finish which I regard as fitting is a preparation made by Toch Brothers, No. 320 5th Ave., New York. In a circular describing the composition they say: "The essence of our discovery is as follows: All Portland cement liberates lime during the process of setting. Lime is alkaline, (which is the opposite of acid) and any oil paint applied to new concrete is destroyed on account of this alkalinity. In studying this condition it was found that a suitable organic acid—preferably an acid resin—applied to cement floors or walls in a thin solution, reacts chemically with the lime and produces what is known as calcium resinate."

I have tried four coats of Toch's cement filler upon one of our tiles, and I find that it makes a clear, transparent hard finish quite similar to an ordinary lead glaze upon pottery. It will stand being washed with ordinary soaps and warm water, and is supposed when used as a finish for cement floors to last at least one year with ordinary wear.—*L. L. Winslow.*

Educational Associations.

Saranac Lake, N. Y. Q:—Can you give me information concerning the National Educational Society? To whom can I write, etc.? Also, information on any national manual training or industrial educational society.

A:—The National Education Association is the great organization of educators in the United States. It has its chief office at Ann Arbor, Mich., in charge of Mr. D. W. Springer, permanent secretary. Memberships in the Association are either associate or active. In either case the annual fee is $2, but active members pay in addition, once, an enrollment fee of $2. The membership includes the privileges of attending the annual meetings of the Association and the winter meetings of the Department of Superintendence, of the Council of Education, etc. It also includes copies of the annual report and year book, as well as of all special reports and bulletins.

In the industrial education field there is one national organization, the National Society for the Promotion of Industrial Education. The Society maintains an office at 20 West 44th St., New York City. The annual membership fee is $2.

Another important national association is the Vocational Guidance Association of which Mr. Frank M. Leavitt, Chicago, Ill., is President, and Jesse B. Davis, Grand Rapids, Mich, is Secretary. The annual fee of this organization is $2.

There is no national association of manual training teachers but there are two sectional associations which are of considerable importance and influence. These are:

"The Eastern Art and Manual Training Teachers' Association of which Mr. Harry W. Jacobs, Director of Art Instruction, Buffalo, N. Y., is President. This Association holds meetings annually, in April or May, and issues a valuable year book.

The other Association is the Western Drawing and Manual Training Association of which Miss Florence Fitch, Indianapolis, is President. The Association holds an annual Convention in the spring and issues a year book which is sent gratis to members. Complete information about the Western Association may be had from Mr. Wilson H. Henderson, Secretary, Milwaukee, Wis.

Dye for Reeds.

San Antonio, Texas. Q:—Can you tell me of a good dye and finishing material for reed baskets?

A:—The Dye, Underlac, and Wax put out by S. C. Johnson & Co., Racine, Wis., is said to be very highly satisfactory for basketry work. A letter to the above firm will bring helpful information about this matter.

Independence, Mo. Q:—Do you advise a course in Whittling for the fifth and sixth grades?

A:—No. The time can be so much more profitably spent. The fact that such courses are now practically discarded from the schools is significant.

Jewelry Discolorations.

San Diego, Cal. Q:—How may one prevent copper rings and bracelets from discoloring the skin of the wearer?

A:—We do not know of any method except the silver plating of the parts next the skin. This could be done by covering the other parts with wax while the plating process is going on.

Cedar Falls, Iowa. Q:—Where may I procure a copy of the Course of Study put out by the Illinois Manual Arts Association?

A:—Mr. C. E. Lang, Chicago, Secretary of this organization, informs us that the supply is entirely exhausted. Twenty-five calls for this Course came to Mr. Lang the week following the mention of it in the May number of this Magazine.

Chicago, Ill. Q:—Could a teacher who does not understand printing, work it out for himself?

A:—One can learn a great deal about printing by reading about it. If such a teacher has an opportunity to spend even a small amount of time in a job shop, he can pick up enough to make his reading real.

Books on Lathe Work and Drafting.

Lewistown, Mont. Q:—I desire to know where I can secure a text in Iron Lathe Work suitable for the first year in high school. Also, a text in Architectural Drawing for high school pupils.—*E. F. R.*

A:—Architectural Drafting by A. Benton Granberg and Charles B. Howe. Price, $1.50, net. Additional loose leaf problems, 2 cents each. John Wiley & Sons, Publishers, New York, N. Y.

There is no text on iron lathe work on the market particularly intended for first-year high school classes. The best books on the subject for beginners are the instruction and reference books of the International Correspondence Schools, Scranton, Pa., and the American Correspondence School, Chicago, Ill.

MILWAUKEE, WIS. In connection with the Continuation School System, a Bakers' School has been opened with an initial enrollment of 53 boys. The school is in session two half-days each week and instruction is offered in the principles and methods of baking, English and business arithmetic.